October 1961

JOURNAL OF THE American Society OF Safety Engineers

50th Anniversary Issue

50TH Anniversary

ANNUAL MEETING ≡ AWARDS LUNCHEON

American Society of Safety Engineers

ANNUAL MEETING, MONDAY, OCTOBER 16, 8:30 A.M.
WALDORF ROOM—CONRAD HILTON HOTEL

8TH ANNUAL AWARDS LUNCHEON
TUESDAY, OCTOBER 17, 12:15 P.M.
BOULEVARD ROOM—CONRAD HILTON HOTEL

- **Incoming President John V. Grimaldi will speak on "Safety Engineering in a Changing World"**
- **Winners of Chapter Achievement Awards**
- **Winners of Technical Paper Awards**

SEE YOU IN OUR BOOTH • 309

3RD FLOOR
HILTON HOTEL

Ticket Information

Tickets are $4.00 each. Make remittances payable to the American Society of Safety Engineers.

Tables will be reserved on request for orders of four or more tickets. Table reservation name signs are made for reserved tables. No table reservations or signs will be supplied unless advance order of tickets and request for table reservation is received by the national office by October 12, 1961.

No mail orders will be accepted after Thursday, October 12, 1961. All orders must include remittances.

Tickets will not be mailed to you. Orders will be held for pickup at the Society's Exhibit Booth, No. 309, Third Floor, Conrad Hilton Hotel. (A limited number of tickets will be on sale at the booth.)

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American Society of Safety Engineers
5 North Wabash Ave., Suite 1705
Chicago 2, Illinois

Please reserve for me _____ ticket(s) for the Eighth Annual Awards Luncheon of the American Society of Safety Engineers, Tuesday, October 17, 1961, in the Boulevard Room of the Conrad Hilton Hotel, Chicago.

Please reserve a table for _____ of the above tickets.

Hold Reservation under the following name _____.

Table Sign should read _____.
(Individual or Chapter)

Enclosed is a check or money order for $_____ to cover the cost of tickets ordered, at $4.00 a ticket.

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Company _____

Address _____

City _____ State _____

JOURNAL OF THE

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OCTOBER, 1961

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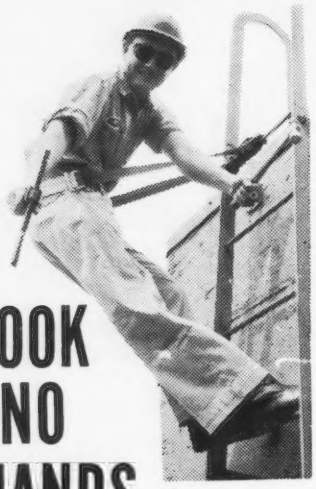
This Month's Cover

• Pictured on the cover is the Grand Opera House which stood at 23rd Street and 8th Avenue in New York City, as it appeared at the turn of the Century. It was one of the first meeting places of the American Society of Safety Engineers. The historic building was erected in 1867 and was the scene of great opera performances until 1902. In 1910 it entered its Golden Era, housing elaborate musical productions by such personalities as George M. Cohan and Sam H. Harris. From 1917 until 1938 when it was razed to make way for a modern motion picture theatre, the Opera House was a vaudeville and movie theatre.



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Hold tight to rung by webbing attached to the safety belt.

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READERS Pulse

(Letters for this column are invited from readers on any subject related to safety, or based upon any material printed in THE JOURNAL.*)*

OUR 50TH ANNIVERSARY

Dear Mr. Gorbell:

On behalf of the National Safety Council, I extend congratulations to the American Society of Safety Engineers on its 50th anniversary.

We appreciate the valuable services performed by the A.S.S.E. Its aid in the production of technical materials and its handling of the Subject Sessions of our National Safety Congress were an important contribution to the advancement of industrial accident prevention.

It is worthy of note in the sharing of credit for half a century of progress in our cause that the American Society of Safety Engineers, the National Safety Council, and Workmen's Compensation all had their beginnings within the span of a few years.

We thus continue to share with you a mutual tradition and a good purpose and the determination to pursue that purpose in every manner and direction that our organizations deem proper and effective.

Good wishes to the A.S.S.E. in that pursuit into the challenging years ahead.

HOWARD PYLE
President
National Safety Council

Dear Mr. Blackman:

The Traffic Institute extends its congratulations to the American Society of Safety Engineers on its 50th Anniversary.

The value of the Society's program is recognized and its contributions to the Nation are considerable. We offer our best wishes for the Society's continued success.

BERNARD R. CALDWELL
Director, Traffic Institute
Northwestern University

Dear Mr. Blackman:

Our warmest congratulations to the American Society of Safety Engineers on attaining 50 years of service to American industry on the 8th of October, 1961.

Having commenced our own activities in 1915, we are well aware of the excellent leadership provided to the safety movement of both the United States and Canada by the American Society of Safety Engineers through its half century of organized safety effort.

Our best wishes for your continued leadership in the effort to reduce the waste of human life and energy caused by accidental injuries.

R. G. D. ANDERSON
General Manager
Industrial Accident Prevention Assn's.
Toronto, Ontario

Gentlemen:

This occasion of your 50th Anniversary gives me an opportunity—which I welcome—to express the regard that Monsanto has for the American Society of Safety Engineers.

Without the research work that you have conducted and the training in accident prevention that you have formulated, plus the standards and codes you have set up, I am sure our plants would not be setting the records that they are.

Your efforts will be reflected in safe manhours throughout the world, and recognition of your contributions is most certainly merited.

CHARLES H. SOMMER
President
Monsanto Chemical Company

Dear Mr. Gorbell:

On behalf of General Motors Corporation it gives me great pleasure and satisfaction to congratulate the American Society of Safety Engineers upon the completion of fifty years of service to humanity.

JOHN F. GORDON
President
General Motors Corp.

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NEW 'LIVING FORMULA X-500 LEATHER' IS NOW AVAILABLE IN LEHIGH SAFETY SHOES!

LEHIGH is the world's only safety shoe available in Living Leather, the revolutionary new leather that stays new-looking 500% longer than ordinary leather! Lehigh Safety Shoes in Living Leather RESIST WRINKLES (Creases "spring out"!) RESIST SCUFFS (5 times more resistance to scrapes, scuffs!) RESIST STRETCHING (Hold their shape under heaviest body weights!) RESIST STAINS (Built-in "stain barrier"!) and each has a famous Lehigh steel safety toe. For the best in safety, styling and long-term value, look to LEHIGH, the lowest-cost safety insurance you can buy. Available for immediate delivery: No. 1614: Brown wing-tip oxford with steel shank, Chro-tan innersole, oak leather outsole, and full leather lining. Sizes A, 8-13; B, 8-13; C, 7-13; D, E, EE; 5-13. No. 1647: Black, blucher oxford with steel shank Chro-tan innersole, oak leather outsole, full leather lining. Sizes A, 8-13; B, 7-13; C, 6-13; D, E, EE, 5-13.

LEHIGH
SAFETY SHOE COMPANY / EMMAUS / PA.

Editorial Comment

This first edition of the "new" *Journal of the American Society of Safety Engineers* brings to reality an objective, or a dream, if you will, which dates back to the infant years of the Society. Here is born a "first" in the history of safety—a publication devoted exclusively to the professional interests of the *individual* safety engineer.

The new *Journal,* as the official publication of the Society, gives us a new and important communications voice, both to our membership and to the community at large. It will serve not only as a medium for presenting information and interpreting policy on matters of interest to the membership but will also portray the "image" of the Society to others.

The objectives of the *Journal* will be synonymous with those of the Society—"To expand the use and effectiveness of safety engineering in the prevention of accidents and the conservation of health, life and property."

How does the *Journal* plan to carry out these objectives? First, it hopes to provide a sounding board to effect a mutual exchange of knowledge and opinion among members and others with a genuine professional interest in safety. It intends to provide safety engineers with the latest available information on new developments in the field of accident prevention. It will deal with problems specific to the safety profession and with the various approaches to their solution. Through its pages the *Journal* should broaden the safety man's perspective of his field and result in the stimulation and development of intelligent thinking in this area.

Editorial standards will be maintained at a level befitting the professional stature of the Society. Each issue will include a Technical Section containing papers dealing with both the exact sciences and such related fields as psychology and business management. Papers on new information developed through research and experience will be especially sought out for publication. Articles concerning controversial subjects will be presented objectively in the Technical Section with as much authoritative information as is available to give the reader a clear understanding of the problem. Papers given to or by other professional bodies, containing technical information of value or interest to our members will also be included in this section.

In addition to the Technical Section, the *Journal* will publish selected material of a general news nature, reviews of current technical literature, news of pertinent legislative developments, discussions of accident case histories and abstracts of published articles on safety and related fields from periodicals throughout the world. (The Society has been selected as one of the world centers for safety information by the International Labour Organization in Geneva, Switzerland. As a center for safety information, we shall review abstracts from thousands of publications, both of the United States and of foreign countries.)

Advertising which appears in the *Journal* will come under the close scrutiny of the Society to assure its adherence to high ethical standards. An Advertising Board has been created to screen prospective advertisements to endeavor to insure that no advertising published in the *Journal* misrepresents its product nor deprecates competitors, or is in poor taste.

The *Journal* staff will rely for counsel and guidance on an Editorial Board, the General Publications Committee and the national Executive Committee.

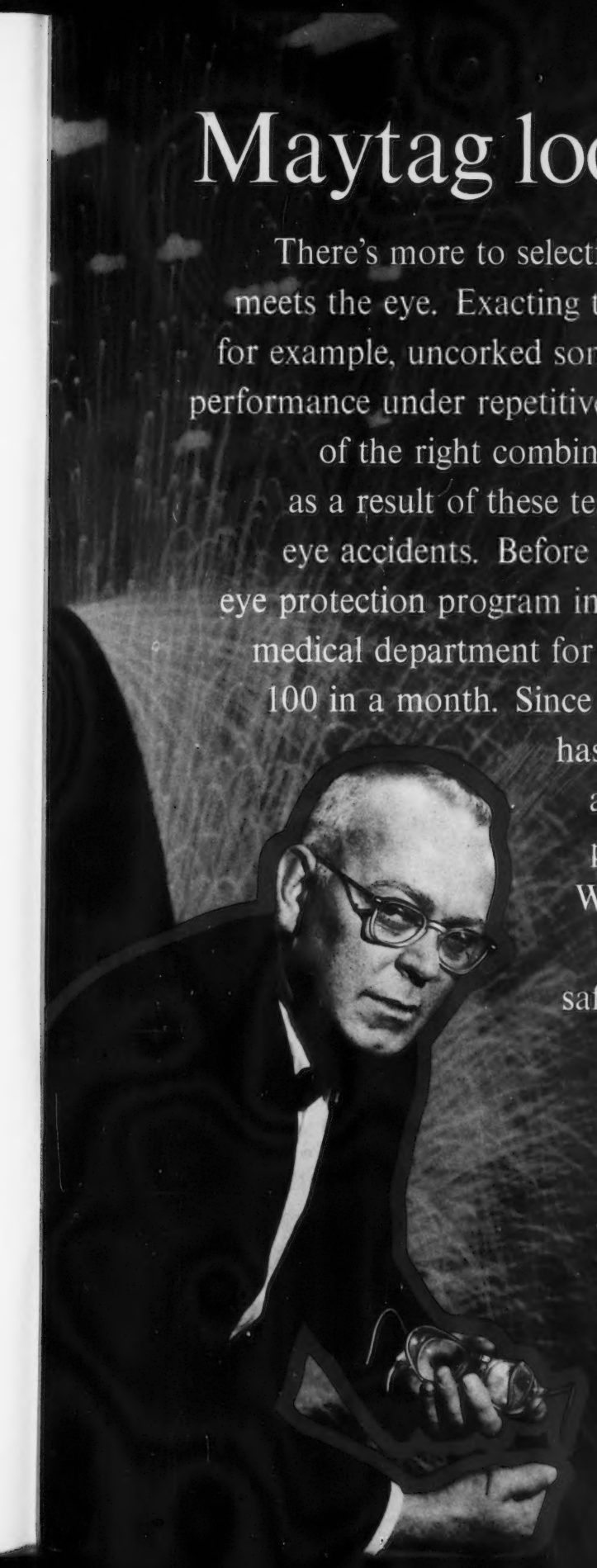
The *Journal* signals the opening of the second half-century for the Society—appearing as it does in the month of our 50th Anniversary. We are confident that in the next 50 years our Society will make even greater progress in its struggle to prevent the sufferings of mankind and the economic losses wrought by accidents.

Lofty are our goals, and high have we set our sights in our dedication to achieve success in the field of accident prevention through not only this one means—*The Journal*—but through the many other activities of the American Society of Safety Engineers.

GEORGE L. GORBELL, PRESIDENT
AMERICAN SOCIETY OF SAFETY ENGINEERS

Maytag looks at lenses

There's more to selecting safety glasses than meets the eye. Exacting tests by The Maytag Company, for example, uncorked some startling facts about lens performance under repetitive impacts. Selection of the right combination of hardness and toughness as a result of these tests has helped Maytag reduce eye accidents. Before Maytag instituted its mandatory eye protection program in 1949, visits to the company's medical department for eye treatments ranged up to 100 in a month. Since then the monthly visitation rate has dropped sharply—to 23.3 in 1955 and 8.4 the past year. Read (next page) about the performance of Willson Super-Tough® lenses in tests conducted by Mr. Dan F. Brady,* safety and plant protection engineer.



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SAFETY IS WORTH WORKING FOR
WILLSON SAFETY CLINIC

turn page

*Member American Society of Safety Engineers

Comfortable Willson safety glasses with plastic sideshields protect workers from hot sparks, metal chips, molten aluminum, and caustic chemicals at The Maytag Company. For some applications, Maytag uses Willson Contour-Specs®, the exclusive hinged-bridge safety glasses that replace up to ten sizes of conventional safety glasses.

Top—Street-glass lens shattered by one blow.

Bottom—Willson Super-Tough lens cracked after 15,867 blows.

Willson Super-Tough® lenses resist impact 5 to 9 times longer

Quality of Willson lenses is proved again by exacting tests and safety records of The Maytag Company, Newton, Iowa.

Repetitive blows by a 26-ounce brass hammer from a 6-inch free fall—*156 in. oz*—produced these results:

Lens	Consecutive blows withstood
Willson Super-Tough	**36,185**
Safety Lens X	**7,207**
Safety Lens Y	**6,943**
Safety Lens Z	**4,138**

"In a similar impact test," adds Mr. Dan F. Brady, safety and plant protection engineer, "a Willson Super-Tough lens (above) withstood 15,867 consecutive blows without cracking.

"The quality of Willson lenses also is shown by their role in helping to reduce our eye accident rate."

Balanced hardness, toughness key to impact resistance

Reason for outstanding impact resistance is Willson's uniform heat treatment. This "annealing" process assures the *proper balance* of hardness and toughness. Hardness resists penetration. Inner core toughness, with correct tension, resists impact. Any defect in ophthalmic glass is exposed during heat treatment.

Also important for eye safety is uniformity of hardening . . . or absence of surface strains. Each Willson lens is tested for uniformity in a polariscope. Any lens which does not produce the cross pattern indicative of uniform heat treatment is rejected. But that's only the beginning.

Every lens is tested for striae, waves, and other defects affecting vision. The lens is held in front of a telescope focused on a ½"-diameter circle 35 feet away. Perfectly parallel lens surfaces make cross-hairs inside the scope fall within the circle.

Willson offers fast service, too! An order for safety equipment is delivered at Maytag within four days by Safety Counselor Ward Andrews, Protective Equipment Company, Chicago.

Contact your Willson distributor for a closer look at *dependable* eye, ear, lung, and head protection.

WILLSON SAFETY CLINIC — SAFETY IS WORTH WORKING FOR

safety is worth working for

WILLSON®

Willson Products
A Division of the Electric Storage Battery Company
Reading, Pennsylvania
In Canada: Safety Supply Company

SAFETY Scope

U. S. participation in a proposed international standardization project on protective clothing has been recommended to the American Standards Association.

Fourteen organizations represented at a recent general conference held by the ASA indicated the need for America to participate in the project. The proposal was made by the British Standards Institution to the International Organization for Standardization (ISO.)

The Safety Standards Board of the ASA will consider the conference's recommendation regarding U. S. participation. Among the areas of study suggested by the British standards body are boots and shoes, eye protectors, safety gloves, belts and harnesses, respirators, personal equipment used in welding and flameproof clothing.

With reported Federal fire losses averaging close to $12 million a year over the past decade, Uncle Sam is taking a long, hard, and continuing look at his far-flung property and at the fire risks involved, the Labor Department's Bureau of Labor Standards reports.

Among other things he hopes to find better ways of preventing the 12,000-plus fires—over a thousand a month—that occur each year on Federal property and that on the average take the lives of 25 persons and injure nearly 400 more.

A new source of toxic hazards has begun to alarm medical and public health officials. The source is the versatile vending machines which dispense everything from soft drinks to soaps. An Indiana patron of an automatic laundry reports that his daughters, believing they were dropping their nickels into a soft drink machine, came up with two unmarked paper cups full of a clear liquid. It turned out to be a bleach with up to 3 per cent available chlorine. Neither child fortunately was injured.

A survey of Washington, D.C. revealed that a number of automatic laundries use dispensing machines which produce cellophane packets of detergents.

An Illinois firm has recently circulated a letter seeking to persuade entrepreneurs to own and operate automatic aspirin-dispensing machines.

The number of driver licenses in force reached 87.4 million in 1960, according to state reports to the Bureau of Public Roads. This represented an increase of 3.4 per cent over those in force in 1959. On the basis of the 1960 total, there were 1.2 licensed operators for each registered motor vehicle.

California continued to lead both in number of operators and vehicles.

Chicago is following the lead taken by a California motor vehicle pollution control board in looking into devices intended to control air pollution caused by motor vehicle exhausts. A proposal was expected to be introduced into the City Council late last month calling for the Council Health Committee to conduct such a research program. The California board is testing several devices with a view toward eventually requiring California auto owners to install them on their cars.

The growth of industrialization throughout Western Europe and the United States during the 19th Century achieved a miracle of production but the introduction of the factory system created unbelievably poor working conditions.

Early factories were poorly-lighted, poorly-ventilated and unsanitary. Machine guarding was unknown and occupational deaths and maimings were frequent. Public indignation rose as deaths and injuries increased until, in the 1850s, the first governmental attempt to improve these conditions was made when England established government factory inspection. In the United States, Massachusetts enacted a factory inspection law in 1867.

Although fatal and disabling accidents were common, damages were seldom paid by plant operators. "Negligence" was the commonly considered cause of an accident and accidents were accepted as an inherent part of industrial operation.

In 1885 Alabama took the first step in defining employers liability with Massachusetts following in 1887. However, despite this early legislation holding the employer legally responsible for safeguarding his employes against accidents, few employers concerned themselves with the safety of their workers.

INSURANCE ENTERS PICTURE

At the turn of the Century a new group other than plant operators became interested in employe safety. Insurance companies began to offer protection against accident loss and in order to classify risks and set rates, these companies employed inspectors to visit the assureds. As these inspectors developed experience in judging risks they became valuable in an advisory capacity concerning the reduction of accident hazards. Thus the science of safety engineering and its use for reducing industrial accidents and operating costs was born.

The year 1911 is generally considered the beginning of "organized" accident prevention in the U.S. This year marked the passage of the first workmen's compensation laws. Although some states had enacted compensation laws before 1911, these early laws were held unconstitutional.

The major difference between workmen's compensation and employer's liability was that compensation made the employer responsible *whether or not negligence could be proved.*

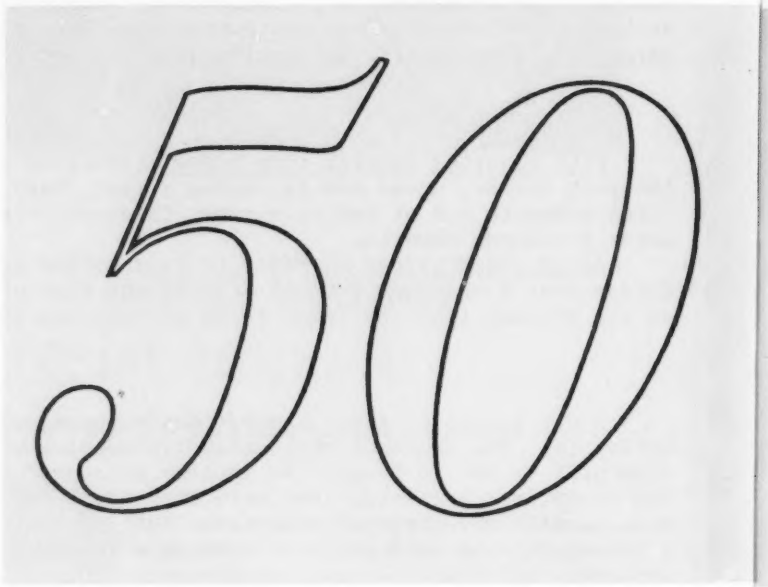
In 1911 several states enacted compensation laws. The first state is considered by some authorities to be Wisconsin. Others have held that New Jersey or Washington was the first. The confusion arises from the date of enactment and the effective dates of the laws. Wisconsin's law, enacted in May, 1911 went into effect immediately. Washington and Kansas passed laws in March but the effective dates were October 1, 1911 and January 1, 1912 respectively. New Jersey enacted its law in April, 1911 but it went into effect in August, 1911. At any rate some 10 or 11 states passed laws in 1911, with three more in 1912 and 11 in 1913.

It was in this historical setting that the American Society of Safety Engineers was born.

RIVALRIES DEVELOP

W. John Pedroncelli, one of the founders of the American Society of Safety Engineers, in an article written in 1917, described events leading up to the organization of the Society as follows:

> The work of the inspectors for safety employed by the insurance companies was marred in the early days by a lack of fraternity and cooperation. Conflicts and bad feelings arose between employes of competing companies and a deep-rooted bitterness developed instead of a friendly rivalry.



In an effort to bring the various inspectors together to work for a common goal, the older men began to explore the possibilities of forming an organization.

On October 8, 1911 the leading inspectors were summoned by George G. Mearns of the Standard Accident Insurance Co. to discuss the formation of an association for *social* purposes. Several inspectors gathered at 123 William St. in New York City and John E. Anderson, supervising inspector for Maryland Casualty Co. was elected temporary chairman.

It was decided to call a meeting for October 14 and at that time the name "United Association of Casualty Inspectors" was selected. Meetings were set up on a quarterly basis beginning in November, 1911 and

membership requirements were established, with an entrance fee of $2.00 and quarterly dues of 50 cents. Membership was open to anyone "presenting an inspector's card in connection with casualty insurance or city and state inspectors."

On October 21 the first members were signed up—35 in all—and the first officers were elected. These included John E. Anderson, Maryland Casualty Co., president; James G. Shaw, Travellers Insurance, first vice president; B. Cummings, Ocean Accident Insurance, second vice president; Edward D. Haggerty, Frankfort Insurance, third vice president; A. A. Frazee, Aetna Life Insurance, secretary; J. Y. Gillespie, Royal Indemnity, assistant secretary; and Charles Berry, Standard Accident Insurance, treasurer.

• For many years until 1924 the Society maintained headquarters at the Engineering Societies Building, 29 W. 39th Street, New York City. This building housed the Founder Societies until last month.

Years of Progress

These early members continued to meet quarterly, holding business meetings, educational meetings and smokers. The February, 1912 meeting was attended by 200 persons and a talk was given on "Guarding of Woodworking Machinery." At that time there were 62 charter members.

Although the newly-founded organization grew rapidly during the next two years, many misconceptions arose concerning its purposes. One thought prevalent at the time was that the association was controlled by the companies for whom the members worked. Another impression was that the association was a labor organization.

Pedroncelli, in 1917, wrote:

> The affairs of the Society never have been and are not now dominated, controlled nor influenced by any outside corporate interests and at no time did the officers and members contemplate or desire a society similar to a labor organization. Not that we are opposed to labor or capital but the duties of our members require association and dealings with both. Therefore the Society must at all times maintain an unbiased and unprejudiced attitude toward all.

In order to dispel many of these impressions and to take cognizance of the broader scope of their field of work, the organization voted to change its name in 1914 to the American Society of Safety Engineers.

The first meeting under the new name was held in the Grand Opera House, 23rd St. and 8th Ave., New York. In 1915 the Society was incorporated in New York State. The stated objectives had been broadened as follows:

> To promote harmonious action in safety work; to educate members by means of lectures, discussions or otherwise, in all matters relating to industrial safety and accident prevention, both mechanically and educationally.

By 1917 the membership had grown to 250 members but while there were scattered members throughout the U.S. and even in Canada, the membership was mainly confined to the New York City area.

Meetings were now held monthly and six committees were functioning —Industrial Plants, Electrical Matters, Structural Matters, Liability Matters, Elevators, and Steam Power Equipment and Boilers. Social affairs consisted of an annual banquet in March and a "Frolic and Shore Dinner" in September. In 1917 the publication "Preservation" published by the Preservation Publishing Co. of White Plains, N.Y. was adopted as the official journal of the Society. Only eight issues were published before the publication was suspended.

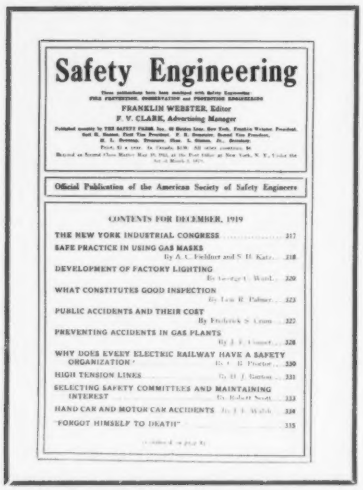
JAMES G. SHAW
Second President

ROBT. THOMSON
Charter Member

The entire budget for the year ending October 31, 1917 was $141.50.

Early presidents following John E. Anderson (1911-12) included James G. Shaw (1912-13); A. A. Frazee (1913-14); Edward D. Haggerty (1914-15); W. E. Welch (1915-16); Harry H. Dehn (1916-17); and Cornelius Van Horn (1917-18).

When the country entered World War 1, many of the Society members



Safety Engineering

FRANKLIN WEBSTER, Editor
F. V. CLARK, Advertising Manager

Official Publication of the American Society of Safety Engineers

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● The first issue of Safety Engineering magazine to carry the line "Official Publication of the American Society of Safety Engineers" was the December, 1919 issue above.

joined the armed forces or went into the service of their country as safety supervisors for industry engaged in war production. Meetings were irregular and there was a dearth of good speakers. With interest in the Society waning, meetings were finally suspended in 1918 and the Society entered one of its worst periods.

At the end of hostilities, a meeting was called to deal the final death blow to the organization. A motion was quickly made to disband the Society and with most members present in favor of disbanding, the 7-year-old group seemed doomed. However, one member rose and asked to be heard. He implored the members present to ask themselves several questions.

Had they considered this action seriously or were they acting with too much haste? Would not the failure of the Society to survive be a crushing blow to the technical aspect of the safety movement? He asked that the matter be tabled until a later date to provide time for further consideration. The meeting adjourned without acting on the motion to disband and set another date two weeks later.

During the next two weeks many of the men prominent in safety engineering were contacted and urged to be present at the meeting in which the fate of the Society was to be decided. Most of these men were not members but it was felt that their presence would influence the others to reconsider the proposal to disband.

NEW SPIRIT SEEN

At the second meeting a new spirit was injected into the Society and with the encouragement of many of these prominent figures who attended or wrote letters, the thought of disbanding evaporated.

It was agreed that a distinct field of "technical engineering" existed in the safety movement and that the Society was best suited to concern itself with this aspect of safety. It was also felt that no area of conflict would exist between the Society and the National Safety Council but that by coordination of activities in their special interests, each group would be of assistance to the other.

A committee was appointed with H. Weaver Mowery as its head, to plan the scope of activity in the reorganization of the Society. In September, 1919, the committee completed its work and the report was unanimously accepted by the membership. The new objectives of the Society were: ". . . to promote the arts and sciences connected with engineering in its relation to safety for life and property." Mowery was elected president for the 1919-20 term at the same meeting.

With new vigor instilled in the Society, growth became rapid and during the next five years it began to take on the aspect of a truly national organization, receiving memberships from as far away as California. Meeting reports, proceedings and papers were published in *Safety Engineering* magazine which had been designated as the official Society magazine in 1919 and the group began to meet in the Engineering Societies building, 29 W. 39th St., New York.

During this time considerable interest began to be shown in the possibility of an amalgamation with the National Safety Council and a formal proposal was made to the Society in

CHARTER MEMBERS

Fred C. Schaller

Titus B. Koepke

D. B. Gilmour

L. S. Schrenkeisen

the summer of 1920. The details of the merger were being worked out and the amalgamation was in the process of being completed when a counter reaction developed.

While members of the Society opposed any useless duplication of effort on the part of the two organizations, they were reluctant to surrender the Society's autonomy in becoming a division of the National Safety Council. Thus the Society rejected the terms of agreement at that time.

Negotiations continued however, and at the Louisville Congress of the Council in October, 1924, the consolidation was completed and the Society became known as the *American Society of Safety Engineers—Engineering Section, National Safety Council.* The original charter was not dissolved and continued in force although the Society was not conducting itself as an autonomous group.

During the years the Society was part of the Council, its concepts changed to meet the ever-changing developments of an industrial world. Its purposes expanded and its membership grew.

In the first year of the consolidation a chapter was formed in Boston. The core of the New York members formed into the Metropolitan Chapter at the same time. By 1930 the Society membership numbered 1,028 and in addition to the Boston and Metropolitan Chapters, there were chapters affiliated in New Jersey and Worcester. The latter group eventually dropped out but during the next five years three more chapters were formed in Philadelphia, Pittsburgh and San Francisco.

By 1940 membership increased to 2,000 and there were 11 chapters.

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The period of greatest growth was between 1940 and 1950 when membership more than doubled (5,300) and chapters increased to 50, including one in Quebec.

As part of the National Safety Council the Society was largely responsible for hundreds of pamphlets, data sheets, detail sheets and reports, many of which are still available in revised form from the Council. In 1930 the Society completed a research project on the "Effects of Annealing on Chains."

Special committees formed to study specific problems produced Safe Practices pamphlets on "Electrical Equipment in Industrial Plants," "Static Electricity," and "Woodworking Machinery and Equipment."

Other special studies published included Data Sheets on "Circular Cross Cut Saw Guards," "Circular Rip Saw Guards," "Elevators," "Blow Torches and Plumbers' Furnaces," "Wire Rope," "Sand Blasting," "Effects of Noise" and "Fly Wheel Explosions and Accidents."

The Society was the sole sponsor of ASA Code A-14 "Ladders," and co-sponsor with the American Society of Mechanical Engineers on ASA Code A-13 "Identification of Piping Systems," and ASA Code B-19 "Compressed Air Machinery and Equipment." It was also co-sponsor with the American Institute of Architects for Code A-22 "Walkway Surfaces," and Code A-64 "Industrial Stairs."

In 1940 when war clouds threatened the U.S. again, the Society assisted the National Committee for the Conservation of Manpower in Defense Industries in conducting more than 115 classes in defense training. The Society was one of nine organizations represented on the National Committee for the Conservation of Manpower in War Industries during World War II.

During the early 1940s the groundwork was laid for special research projects on Plastic Eye Protectors, Safety Belts, Harnesses and Accessories and the Cost of Accidents, all of which were eventually completed and published.

● The Certificate of Incorporation chartering the American Society of Safety Engineers, issued by the State of New York, March 27, 1915, was retained by the Society during its 1924-47 period of association with the National Safety Council. Above is a 1949 photograph of the then president R. H. Ferguson receiving the original document from H. Weaver Mowery, left, Society president during 1919 and 1920.

During the early years of the 40s, the all-out war effort occupied the minds of members so that changes in Society structure were deferred for the duration. However, with the return to peace, sentiments began to grow again for an "independent" Society.

Functioning as the Engineering Section of the Council, productive as those years had been, the Society felt it was not entirely controlled by its members. It had come a long way from the dark days of 1919 and was beginning to flex its muscles and preparing to strike out on its own again. "Independence" became the major subject of discussion among the membership and finally the Society proposed autonomy for itself.

Negotiations were carried on with the officers of NSC and at the October annual meeting in 1947, the membership voted to reestablish the Society as an independent organization.

MANY MILESTONES PASSED

Since 1947, many milestones were passed as the Society matured. Activities with the American Standards Association expanded; a college course outline was completed and several other projects were undertaken in the field of higher education; liaison was established with 25 other societies and innumerable joint ventures were sponsored both on the national and chapter levels; research was continued and expanded and the Society took strong action in an effort to raise the professional standing of the safety engineer.

In 1948 the Society adopted the "Canons of Ethics for Engineers." The Society elected its first Honorary member—John Roach—in 1946 and its first Life Member—George E. Sanford—in 1947. In 1952 the first Chapter Achievement Award program was established and named in honor of the Society's secretary and managing director from 1945 through 1952, Albert D. Caddell.

The 1956 the *Journal* of the Society was first published as a quarterly supplement in the *National Safety News* and in 1959 the Society took the final step in its road to complete independence by establishing its own headquarters in Chicago. That same year the Technical Paper Award program was initiated in cooperation with the Veterans of Safety and in 1960 the first comprehensive study of the status of the safety engineer was completed and published.

During the 14 years since the Society returned to its autonomous status, it continued to sponsor Special Subject sessions annually at the National Safety Congress.

Today with more than 7,200 members and 76 chapters, the Society is at the threshold of a new era. The Constitution and By-Laws have been completely modernized. The new *Journal*, making its appearance in this, the Golden Anniversary month, symbolizes the goals of the future. Rewarding as it has been to look back over the past fifty years, the membership and new officers are turning their eyes toward the future, and visualizing the role of the American Society of Safety Engineers in their never-ending struggle to serve mankind.

"What's in it?"

"Fifteen brand-new MSA products."

"Going to open it?"

"Not now."

"When?"

"October 16th."

"Where?"

"At the National Safety Congress in Chicago."

"What kind of products?"

"That's a surprise."

"Won't tell, huh?"

"Tell you all about them October 16th. Drop around booths 83 to 86."

"Fifteen new MSA products?"

"Fifteen."

ADMINISTRATOR DISCUSSES:

Federal Safety Regulations under Walsh-Healey Public Contracts Act

BY CLARENCE T. LUNDQUIST

THE FIRE EXIT was blocked by storage crates. Aisles were coated with a greasy scum. Oil-soaked rags lay abandoned on the floor. Frayed wiring was prevalent. These and other flagrant hazards were revealed when representatives of the U. S. Labor Department's Wage and Hour and Public Contracts Divisions inspected plants making defense items for Uncle Sam's armed forces.

This company's violations were preventable. They would not have occurred had there been compliance with safety and health requirements issued under the Walsh-Healey Public Contracts Act, which provides that Government supply contracts in excess of $10,000 shall not be performed under unsanitary or hazardous conditions. This firm was one of more than 3,000 Government contractors whose establishments were inspected last year for compliance with the safety and health requirements of the Act.

PENALTY TO COMPANY

Failure to comply can hurt a firm's business as well as result in injury or death to workers and property damage, since firms found in violation can be listed as ineligible to get contracts subject to the Act from any Federal agency for three years.

The Wage and Hour and Public Contracts Divisions are ready to lend positive assistance in helping firms comply with safety and health requirements, and its safety engineers are available to provide technical assistance and advise firms how to conduct more effective safety programs.

CHANGING TECHNOLOGY

The engineers constantly study changing technical developments in order to devise safeguards to meet new hazards. These safety engineers are ready to assist more than 600 Wage-Hour investigators to conduct safety inspections in firms having contracts subject to the Act. The investigators themselves are trained in accident prevention techniques by the safety engineers and apply the Labor Department's safety standards.

The U. S. Labor Department's safety standards were published in the Federal Register December 28, 1960, as official regulations under the Act, effective January 27, 1961. They are intended to promote observance of the safety and health requirements by providing a single standard in lieu of various differing standards used previously for all work subject to the Public Contracts Act.

This should do away with uncertainties on the part of Government contractors, caused by the differences among the various State safety, sanitary and factory inspection laws.

Based on 24 years' experience in enforcing the Public Contracts Act's safety and health provisions, the regulations incorporate basic recommendations of outstanding public and private authorities in the field of industrial safety and hygiene, including the American Standards Association, the National Fire Prevention Association, and appropriate agencies of the Federal Government.

To profit by the safety standards, you do not have to be performing on a covered contract. Any firm or employee organization wanting to reduce industrial accidents may obtain from the Divisions a free copy of the new regulations, which contain 34 major categories on safety and health requirements, ranging from housekeeping to pressure vessels and flammable liquids.

Included are such important subjects as safety and health requirements for buildings and equipment, yards and grounds, compressed gases, elevators, pressure vessels, and woodworking machines.

LATEST KNOWLEDGE

In addition, the regulations incorporate the latest knowledge on how to cope with such common hazards as falls, falling objects, electrical equipment, fire hazards, unguarded machinery, and atmospheric contaminants. They also point out how to maintain good housekeeping and provide for first aid.

Incorporated into the regulations is a section dealing with falls, which sets forth standards intended to eliminate both "on the same level" falls and falls from one level to another. It is stipulated that floor surfaces must be kept clean and dry and in a reasonably non-slippery condition. If the nature of the work requires that it be performed on slippery floors, the area must be protected by mats, grates, cleats or other high-friction floor coverings.

This section also contains standards to meet dangers of falls from floor or

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Clarence T. Lundquist is administrator of the Wage and Hour and Public Contracts Division of the U.S. Department of Labor, and is responsible for administration of the Walsh-Healey Public Contracts Act. Mr. Lundquist entered the government service in 1935 with the Bureau of Labor Statistics of the Labor Department. He transferred to the Wage and Hour Division in 1938 and remained until 1942 when he entered the armed services. In 1955 he returned to the Division and was named administrator in 1958.

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Medical Journal warns laymen against untested adjuncts (N. Y. Jl. Med., Vol. 60; 3, '60)

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wall openings, or elevated platforms. Included, too, are related matters such as standards for stairways, maintenance of aisles and passageways, and ladder specifications. Falls constitute one of the major hazards in industry and particular care must be taken to comply with the regulations.

Falling objects can result in accidents no less serious in consequence than falls sustained by persons. One of the primary causes of such accidents is improper piling of materials. The Department's regulations specify that materials must be piled in such fashion that they will be stable, and point out the devices which can be employed to this end.

There have been great advances in machine-guarding in recent years, and a protection can be developed for almost every hazard. Yet investigators still find unguarded belts and pulleys and points of operation, in gross violation of accepted standards which are contained in the regulations. The regulations also indicate how to avoid severe injuries to eyes, hands, and fingers that are caused by abrasive wheels which explode or have improperly adjusted tool rests.

Explosions, fires and shock are the major hazards resulting from faulty electrical equipment. The Department's regulations adopt the "National Electrical Code" published by the National Fire Protection Association. Among the requirements are standards concerning wiring and installations in places where there are flammable gases or dusts.

STANDARD LIGHTING PRACTICE

Safe installation is one part of the problem of suitable electrical equipment. Another is its adequacy. Illumination must be adequate for the safe performance of all work, no matter when performed. The standards contained in the regulations are those established by the American Standards Association in its "American Standard Practice for Industrial Lighting."

Modern industrial processes require the use of flammable materials. The avoidance of fire hazards inherent in the use of gasoline, naptha, many paints, lacquers and similar materials, requires safe storage and handling, in compliance with the Divisions' regulations.

A ladder does not rate as a fire escape! Every building over two stories high must have more than one way of escape from fire, leading to adequate fire escapes on the outside or to properly maintained inside stairways. There must be properly designated exit doors. Systematically inspected fire-fighting equipment, whether built-in or hand-operated, is another "must."

Health hazards attributable to polluted air are causing increasing attention and concern nationwide. The Department's regulations combat this danger in the workplace, specifying that workers must not be exposed to concentrations of atmospheric contaminants hazardous to health. A table of values on maximum allowable concentrations for gases and vapors is provided. This, however, is not the only criterion on maximum concentrations. Such factors as the nature of the contaminant and the frequency and duration of exposure are also involved.

EYE PROTECTION

If there is risk that contaminants will cause injury or impairment through skin or mucous membrane absorption, the worker must be provided personal protection equipment, fitted to him. The employer is responsible for the exercise of supervision to make sure that the equipment is used.

If there is a reasonable likelihood of eye injuries as the result of exposures, proper eye protection must be provided.

It is the Divisions' experience that such conditions as fall hazards, fire hazards, faulty electrical equipment and unguarded machinery are seldom found alone. They usually occur in plants that pay little or no attention to housekeeping.

The official regulations make it clear that clean and sanitary conditions must prevail throughout, and that equipment, too, must be kept clean. If workers are exposed to harmful materials in the workroom, there must be a separate lunchroom, adequately ventilated, lighted and heated. The firm must provide adequate washing and toilet facilities, with hot and cold running water, soap and individual towels. The common drinking cup is out!

MAINTAIN FREQUENCY RATES

Contractors are also required to maintain injury frequency rates. These rates must be calculated quarterly on a calendar-year basis, beginning with the first of January of each year. The method of calculations and definitions prescribed follow standard procedure in the safety field. The records on which the frequency rate is based must be retained for three years.

During all periods of plant operation in a firm working on a covered contract, there must be available a person who has been trained to administer first aid and to handle accident emergencies.

First-aid facilities and services should be used only for first aid, and should not in any way take the place of necessary care and treatment by a physician. In the absence of a physician, emergency first aid should be given by a trained first-aid worker.

64,339 CONTRACTS

An indication of the importance of the official Federal standards as a means of promoting safe and sanitary working conditions is revealed by the fact that 64,339 unclassified contracts amounting to $11,787,570,000 were awarded subject to the Public Contracts Act during fiscal year 1960. In addition, large numbers of contracts classified as confidential under military security regulations are also subject to the safety and health provisions.

Of course, when once a contractor undertakes compliance, either through his own alertness in assuming statutory responsibilities or as the result of an inspection, he tends to remain in compliance beyond the life of the contract.

In 27 States, safety and health inspections are made by investigators and safety engineers of the Wage and Hour and Public Contracts Divisions. In the remaining States, inspection of plants is undertaken by State officials through cooperative agreements between the U. S. Labor Department and State labor departments.

HIGHER STATE STANDARDS

The Federal regulations are not intended to limit State or local safety and factory inspection laws where such laws provide higher standards. The Federal regulations will not relieve anyone from any obligation to comply with any more strict standard stemming from any other source whatsoever. However, where State or local laws are less strict, the uniform standards contemplated by the Federal regulations will prevail.

No Government contractor need rely on guesswork about the safety and health requirements. The nearest Wage-Hour office is ready to answer specific questions. Copies of the new regulations, entitled "Safety and Health Standards for Federal Supply Contracts," are available on request.

The Divisions' regional offices are located in Boston, New York, Chambersburg (Pennsylvania), Birmingham, Cleveland, Chicago, Kansas City (Missouri), Dallas, San Francisco, and Nashville. Also, inquiries may be made at any of the 78 field offices located throughout the various States.

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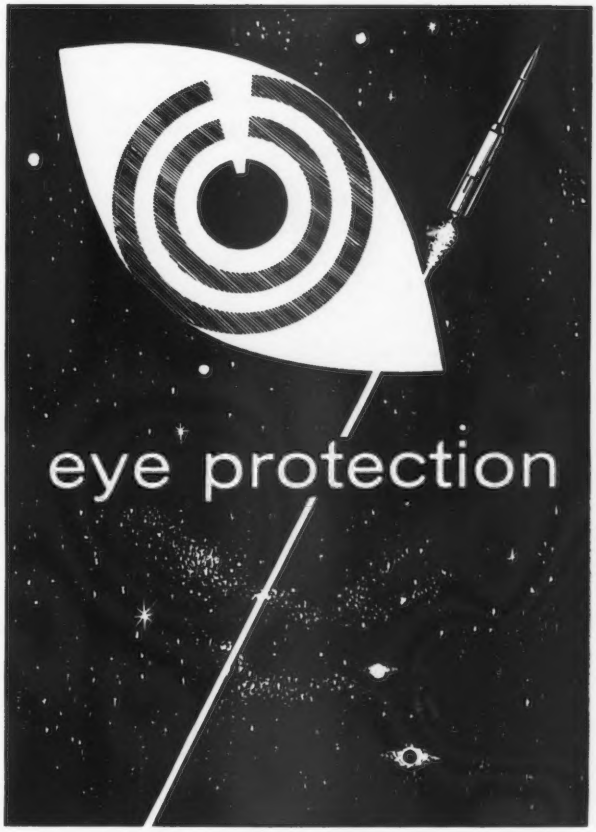

PREVIEW—

another first by U.S. Safety at the National Safety Congress, Conrad Hilton Hotel, Chicago, October 16-19. Booths 100, 101, 102.

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● Incoming Society President Dr. John V. Grimaldi will be the speaker at the Eighth Annual Awards Luncheon. His subject is "Safety Engineering in a Changing World."

It's Congress time!

Highlight of the Society's Eighth Annual Awards Luncheon will be an address by Dr. John V. Grimaldi, incoming Society President, consultant, safety and plant protection, General Electric Co., New York City.

The luncheon will be held Tuesday, October 17 at 12:15 p.m. in the Boulevard Room of the Conrad Hilton Hotel, Chicago. Tickets for the luncheon will be available at the Society's exhibit booth (#309) in the hotel's third floor exhibit area all day Monday and Tuesday morning, while they last.

Presentation of the Third Annual Technical Paper Awards will be featured at the luncheon. Judges for this competition, co-sponsored by the American Society of Safety Engineers and the Veterans of Safety include John F. Jones, chairman; George W. Harper, chairman of the society's Committee on General Publications, and Henry G. Lamb, chairman of the Committee on Technical Publications. Representing the Veterans of Safety are F. Rutledge Davis, chairman of the organization's Research Committee and William N. Rice, chairman of the Veterans of Safety Committee on Awards and Other Societies.

The Albert D. Caddell Chapter Achievement Awards will also be presented at the Tuesday luncheon. Of the Society's 76 Chapters, 22 participated in the Chapter Achievement Award Contest for the 1960-61 year.

On Saturday, October 14, at 9 a.m., the National Executive Committee will meet at the Conrad Hilton Hotel.

The committee will consider petitions for chapter status from groups in New Haven, Conn. (Nutmeg) and Norfolk, Va. (Piedmont). Annual reports from region vice presidents and all committees will be submitted at the meeting and the Finance Committee will present the Society budget for the 1961-62 year.

Other matters to be considered by the Executive Committee will be the dissolution of the Society charter in the State of New York and chartering of the American Society of Safety Engineers in Illinois.

At the meeting a final report will be presented by the Special Committee on Revision of the Constitution and By-Laws. (The complete proposed revision of the Constitution and By-Laws appeared in the August issue of *Engineering for Safety.*)

Results of preliminary investigations into the feasibility of the Society purchasing a building as its permanent headquarters or leasing larger quarters when the lease on the present headquarters expires in May, 1964, will also be discussed. Managing Director A. C. Blackman will report to the Executive Committee on this question.

The Executive Committee will also consider and discuss the entire question of future relationships between the American Society of Safety Engineers and the National Safety Council.

The Society's Annual Meeting will be held Monday, October 16 at 8:30 a.m. in the Waldorf Room of the Conrad Hilton. Business on the agenda of the Annual Meeting will include reports from President George L. Gorbell and Managing Director Blackman. The Teller's Committee will report the results of the election of officers for the 1961-62 year and the new officers will be presented to the Society during this Congress.

Governor Howard Pyle, president of the Council will make the presentation.

The Society is again sponsoring 16 Special Subject Sessions at the National Safety Congress this year. More than 10,000 safety people are expected to attend the Congress including over 1,500 A.S.S.E. members.

Speakers at these sessions will cover material that will be useful to newly-appointed safety personnel as well as to safety veterans.

In place of "Accident Prevention Fundamentals," three sessions have been arranged to provide a penetrating review and analysis of newly-developed or refined safety concepts, principles and practices.

Under the general heading, "New Concepts and Trends in Safety," the meetings will all be held in the Grand Ballroom of the Conrad Hilton Hotel.

"New Dimensions In Safety Management" will be the subject of the Tuesday, October 17 session, with the Human Element in Safety," will be presided over by Michael F. Biancardi, manager of safety services, Allis-Chalmers Mfg. Co.

The three speakers at this session will include Dr. John MacIver, assistant medical director, U.S. Steel Corp., Pittsburgh, whose talk is titled "The Psychology of Accidents"; L. W. Baker, manager, Information and Community Services, Allis-Chalmers Mfg. Co., Milwaukee, will consider "Communications for Safety"; and R. B. Miller, Human Factors Systems Engineering, I.B.M., Poughkeepsie, N.Y., who will talk on "Human Engineering for Safety."

Thursday's session, presided over by Dr. Walter A. Cutter, director of the Center for Safety Education, New York University, will be on "Key Factors in Modern Safety Engineering."

Included will be talks on "Safety Engineering—a Modern Concept" by John J. Ahern, director of security, General Motors Corp., Detroit;

The CONRAD HILTON HOTEL on Michigan Avenue in Chicago, scene of the 49th NATIONAL SAFETY CONGRESS
SOCIETY'S ANNUAL MEETING
Monday, October 16, 8:30 A.M.
EIGHTH ANNUAL AWARDS LUNCHEON
Tuesday, October 17, 12:15 P.M.
16 SPECIAL SUBJECT SESSIONS
Tuesday-Thursday, Oct. 17-19

to the Society membership at that time.

The entire proposed revision of the Society's Constitution and By-Laws will be presented to the membership at the Annual Meeting. At that time members will have an opportunity to submit any additional amendments to the revised Constitution and By-Laws.

In recognition of the contributions made by the American Society of Safety Engineers to the field of accident prevention, during the 50 years of its existence, the National Safety Council will present a special citation

Clyde F. Schlueter, accident prevention manager, Employers Mutuals of Wausau, Wausau, Wis., presiding.

Tom Sullivan, A. O. Smith Corp., Milwaukee, will discuss "Integrating Accident Prevention with Production"; Charles A. Craft, George Fry and Associates, Chicago, will talk on "The Modern Role of the Safety Specialist"; and James A. Lee, Management Institute, University of Wisconsin, will speak on "Uses and Limitations of Committees in Modern Business."

Wednesday morning's sessions, under the heading, "A New Look at "Dynamic Safety Criteria—An Engineering Approach" by William A. McAdams, manager, industrial standards, General Electric Co., Schenectady, N.Y. and "Casualties, Catastrophies and Controls" by Dr. John V. Grimaldi.

Because of the critical world situation, the Society has planned a two-part series on "Industry Mobilization and Emergency Planning." Two sessions, to be held Wednesday and Thursday, October 18-19 in Private Dining Room 2 of the Conrad Hilton, are under co-sponsorship

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Congressman Roberts Raps Auto Makers For Increasing Toll in Traffic Accidents

NEW YORK—Representative Kenneth A. Roberts (D., Ala.) has blamed Detroit's long-time resistance to test-proven automobile safety features for America's sharply increasing number of highway accident fatalities. Congressman Roberts is chairman of the House subcommittee on health and safety.

Calling for the burden of driver safety to be placed directly on the auto makers, Congressman Roberts, in an article published in the October issue of *Saga* magazine, stated that "with a prediction of 40 per cent more auto mileage to be driven in the decade ahead, the toll will go higher, unless more attention is paid to the vehicle itself."

Titled "We Can Build a Crash-Proof Car!" the Roberts article urged installation of safety belts as standard equipment on all cars, a hydraulic bumper for absorbing collision shocks, developed by Professor James J. Ryan, professor of mechanical engineering at the University of Minnesota, and the use of U.S. Rubber Company's Ensolite for interior padding.

According to Congressman Roberts, the incorporation of these features—for an estimated additional cost of from $40 to $100—would make conventional Detroit cars "almost immune from accidents."

Manufacturers have done things to increase auto safety, the congressman said, but much more remains to be done in the face of 40,000 deaths each year and five million injuries resulting from "our national highway hara kiri."

Congressman Roberts, representing Alabama's Fourth Congressional District, warned that "if industry will not move quickly, then there is another way—and that way must be used!" What this means, the congressman explained, is that legislative action by the states and local communities "could accomplish many of the things that must be done if we are to reduce the traffic toll. They could pass legislation to require higher safety standards for vehicles sold within their borders."

"The automotive industry is the only transportation industry in the nation that has no federal regulations governing its safety standards. It may be that the only way we can get an injury proof car is by prescribing it to the industry.

Air Electric Hazards In Government Plants

SALT LAKE CITY—The critical role of electrical systems in government plants manufacturing poison gas and other toxic material was emphasized here recently at the Pacific General Meeting of the American Institute of Electrical Engineers. The meeting also was told that there is need for an Institute Technical Group for plant electrical engineering to "provide a more useful and comprehensive medium for dissemination of information and exchange of ideas" to "stimulate greater interest on the part of plant electrical engineers."

These subjects were discussed by David Kamaroff, U.S. Army Chemical Corps, Army Chemical Center, Maryland, in a paper, "Plant Electrical Engineering in the U.S. Army Chemical Corps," presented at a symposium on industrial and commercial power systems.

"Electrical distribution systems in the government's five Chemical Corps installations consist of 18 prime substations and more than 600 miles of subtransmission and distribution lines valued in excess of $10,000,000," Kamaroff said.

"Electric power is supplied by public utilities and because of the nature of the chemical plants, the plant electrical engineers must take extraordinary precautions to avoid interruptions of power supply, faults and lack of capacity when needed."

Study Fire Hazards of Nitric Systems

WASHINGTON, D.C.—An extensive research program into the fire hazards of ammonium nitrate and related materials will be undertaken by the Bureau of Mines, U.S. Department of Interior, under a cooperative agreement with the Manufacturing Chemists' Association, Inc., the association has revealed.

The research project is expected to begin shortly and will run for one year, with the entire cost of $60,000 borne by the association. The agreement provides for an extension beyond the one year period if necessary.

According to the cooperative agreement, the research will cover not only the fire hazards of ammonium nitrate, but of such related systems as nitric acid-hydrocarbon, ammonium nitrate-urea, and combinations of these systems.

The Bureau will study the effect of contaminants, and of confinement on the detonability of solid and molten ammonium nitrate and evaluate its sensitivity to initiation by the close proximity detonation of other explosive systems, such as may have been present during a train derailment, fire and explosion Dec. 17, 1960, near Traskwood, Ark.

Although an attempt will be made to establish the relative probability of causes of the Traskwood incident, a longer range goal will be to define more precisely the various conditions under which ammonium nitrate may be stored and transported safely.

The Bureau's investigation will be carried out under the direction of Dr. Robert W. Van Dolah, chief, Explosives Research Laboratory, Pittsburgh. Dr. W. G. McKenna of New York City, representing the Bureau of Explosives of the Association of American Railroads, will serve as a consultant in the study.

Industrial Hygiene Board In Certification Program

The American Board of Industrial Hygiene invites inquiries from persons interested in applying for voluntary certification in the profession of industrial hygiene.

Certificates will be issued on the basis of an examination to those who have eight years of practice, following a suitable baccalaureate degree. No examination will be required of those who have 15 years of practice with recognized contributions to the field, following acceptable education.

Certain specialists within the field will be certified when one-fourth of their time has consistently been devoted to application of their specialty to industrial hygiene.

A brochure describing the certification program, and giving more details of eligibility will be sent to those who direct inquiries to Henry F. Smyth, Jr., Secretary-Treasurer, American Board of Industrial Hygiene, 4400 Fifth Ave., Pittsburgh.

LAWS AND REGULATIONS

Federal

Several bills of interest to the safety man were introduced into the 87th Congress this year but with both Houses lumbering to a close late last month, it appeared that no action would be forthcoming on most of them.

(Final disposition of these bills, if any, was not known as this issue went to press.)

One bill (introduced into the Senate as *S. 1713* and into the House as *H.R. 5563*) would establish a system for the classification and compensation of professional engineering, physical science and related positions in the Federal Government. This bill would increase pay scales and redefine and classify certain positions for professional-scientific personnel in government service.

No action was expected on *H.R. 1267* which was referred to the House Education and Labor Committee. The bill, introduced by Rep. Herbert Zelenko (D-N.Y.), would set Federal standards for compensation for injury or death due to radiation. Supporters of the measure are expected to push for its enactment during the 1962 session.

H.R. 9243 (H.R. 133), introduced by Rep. Kenneth A. Roberts (D-Ala.) to establish a "National Accident Prevention Center, was referred to the Committee on Interstate and Foreign Commerce. The Center would conduct, assist and foster research relating to the causes, and methods of preventing accidents; help coordinate the research and control programs conducted by public and private agencies and organizations; make grants-in-aid to universities, hospitals, laboratories, and other agencies; and establish an information center on causes and prevention of accidents.

A bill introduced in the House by Rep. Glenn Cunningham (R-Neb.) was expected to be reintroduced in the Senate with changes by Sen. Hubert H. Humphrey (D-Minn.). The bill, *H.R. 2466*, provides a system of safety rules, regulations and safety inspection and training for Federal agencies. The bill would require the head of each Federal agency to "provide places and conditions of safe employment; to acquire and use such safety devices which are necessary to protect their employes; and to prescribe safety standards and practices for their employes."

A number of the State Legislatures in session this year passed new laws relating to various aspects of safety and workmen's compensation. Here are some highlights of State Legislative action:

Missouri

Hiked workmen's compensation benefits, temporary total and partial from $45 to $47.50 a week; permanent total and partial from $40 to $42.50 a week; burial benefits from $500 to $650 and death benefit maximum from $15,000 to $16,500. The bill also allows benefits for mutilation and permanent disfigurement for injuries to "normally exposed parts of the body" instead of only "head and face."

The state also set up a new point system for revocation and suspension of drivers' licenses; made driving while driver's license is suspended a misdemeanor punishable by one year in jail; and increased the penalty for driving while intoxicated. A bill authorizing chemical tests to determine driver intoxication died in the Senate, as did bills providing for annual safety inspection of motor vehicles, and requiring governors limiting speeds to 80 miles per hour. A bill requiring laminated safety glass in all cars sold after January 1, 1962 was defeated in the House.

Oregon

The State of Oregon passed laws raising the maximum fine for throwing away burning material upon any forest lands, private road, public highway or railroad right-of-way from $75 to $500 and six months in jail; repealing the existing Oregon law and establishing a more comprehensive law covering installation, alteration, repair maintenance and operation of elevators; and establishing new regulations for boilers and unfired pressure vessels. A number of bills affecting workmen's compensation failed to pass this session. These included bills to overhaul the present State Industrial Accident law, to revise the Workmen's Compensation Act to give Oregon employers three ways to provide workmen's compensation insurance benefits—insuring with the State insurance company, insuring with a private insurance company or self-insuring; to increase the permanent partial disability, the temporary total and permanent total disability benefits; and to eliminate the distinction between hazardous and non-hazardous occupations and to change the definition of accidents in relation to the problem of heart cases being declared compensable.

Vermont

The State of Vermont passed legislation which revises the occupational disease law to provide partial disability benefits and increases medical and hospital benefits from $500 to $1,000. The law also broadens the schedule of diseases to include ionizing radiation and disease resulting from exposure to chemicals. The state also approved two bills establishing a driver re-training program and setting up ski safety standards and regulations.

Massachusetts

The Massachusetts legislature has passed a bill reorganizing the Industrial Accident Board to eliminate a backlog of some 5,000 workmen's compensation cases by consolidating the powers of the board in the chairman, increasing the terms of the members to 12 years and by eliminating any outside business activity of the board members. The state also approved new legislation increasing the penalty for violation of regulations relating to the prevention of occupational diseases caused by ionizing radiation from $100 to not more than $500 for each offense. Other laws passed extend requirement to every establishment which employs one or more persons to be ventilated so that all gases, vapors, dust, fumes or any impurities injurious to health be rendered harmless; and extend the law protecting employes against occupational diseases by inhalation of dust by requiring the installation of mechanical means, if necessary, in *any* place of employment instead of the present requirement covering workshops or factories.

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Engineering *as a foundation for optimum safety success*

BY WILLIAM E. TARRANTS

AT PRESENT there is some controversy over what precisely is required to achieve the objectives of industrial safety. Some writers believe that there has been an overemphasis of the engineering approach at the expense of an appropriate consideration of management factors. Others contend that the objective of creating an optimum safe climate can be achieved most effectively through the application of engineering techniques as a primary approach to the solution of accident problems.

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Essentially it is the perspective from which the safety practitioner's training and work activities are viewed that influences one's point of view.

Answers are needed to such questions as: What type of training best prepares a person to function as a safety specialist? What activities should the safety specialist perform? What are the anticipated requirements of the industrial safety specialist of the future?

Answers to these questions should lead us to a clarification of the present positions and provide guidelines for future optimum safety success.

It should be recognized initially that there is no dichotomy between the engineering and management approaches to safety achievement. While the

safety engineer normally operates in a staff position, he needs a detailed knowledge of line functions if he is to effectively serve line managers. The many tools of the manager such as planning, organizing, coordinating, controlling and communicating are important to the safety engineer.

At the same time, the safety engineer has no direct managing authority in the line structure. His only authority is that of knowledge and the soundness of the information he provides. His success is a function of his ability to gather well documented facts based on valid measures of safety effectiveness. His efforts must largely be directed toward providing line management with accurate decision-making information.

ABILITY TO SEE HAZARDS

The safety engineer is a resource person who should possess as a basic skill the ability to perceive hazards which others without his orientation may overlook. His primary justification for existence rests with his ability to perceive problems and deliver sound information so that managers can properly weigh the safety aspects of their decision-making situations.

It is this environmental hazard perception capability that enables the engineering-trained safety specialist to seek the environment control solution as a first step toward optimum safety success.

Future applications of engineering knowledge to the control of work environments will allow the safety engineer to meet the challenge of technological advances. The engineer will be in the best position to adapt future work environments to the physiological and psychological limitations of man while keeping foremost in mind the functional requirements of production. What is needed is total industrial "climate" consideration, with the objective of reaching the optimally safe as well as efficiently productive man-machine-environment system.

ENGINEER THE ENVIRONMENT

It appears that, since human factors are frequent contributors to contemporary accident problems, a preferred immediate approach would be to engineer the environments so that the probability of accidents involving human factors will be minimized. Of equal importance is the engineering of environments so that, when an accident does occur, the severity of the injury or result of the accident will also be minimized.

An important question for future safety effectiveness is: What type of training should the safety specialist receive in preparation for his engineering role?

In the more specialized industries where accident problems predominately arise within a relatively narrow, technical field, it would be most desirable for the safety engineer to have a rather strong background in the particular engineering specialty concerned.

Thus, a company in the chemical industry might prefer a chemical engineer, while a company in the atomic energy industry might most profitably seek an engineer with a background in ionizing radiation.

For companies with diversified products and for most companies falling within less specialized industrial categories, it is suggested that courses pursued by the contemporary college-trained industrial engineer provide the best preparation for safety engineering work.

INDUSTRIAL ENGINEERING CURRICULUM

A glance at the major subjects included in the present undergraduate industrial engineering curriculum will serve to illustrate this point. The first two years of a modern five-year undergraduate engineering curriculum are basically identical for all major branches of engineering. The subjects of chemistry, engineering drawing, physics, mechanics and mathematics are included, along with courses in English and the humanities.

The last three years of the industrial engineering curriculum consist of courses which are well-suited to the safety specialist's activities. Included are such courses as:

- Manufacturing processes
- Statistical theories and applications
- Advanced numerical analysis, including computer programming
- Physiological and industrial psychology and sociology
- Corporate organization and control
- Production engineering
- Industrial cost control
- Labor relations
- Industrial management
- Personnel management
- Industrial electronics and control
- Safety Engineering
- Design of production systems
- Methods analysis and time study
- Work measurements and standards
- Plant layout and materials handling
- And various electives in the humanities and social sciences

It is suggested that this educational background provides the safety specialist of today with an immediate functional capability, while serving as basic preparation for the task of optimizing future safety effectiveness.

It is recognized that limitations in environment or operational control capabilities result in the human

factor playing a predominant role in many contemporary industrial accident situations. In some instances there are limitations on the degree of engineering control currently possible. In other cases engineering control may only asymptotically approach an ultimate total limit because of the desirability of retaining the human component in the system. Personal factors, therefore, will continue to require the attention of the practicing industrial safety engineer.

It should be noted that the industrial engineering curriculum suggested as foundation training for the safety specialist places strong emphasis on the human behavior or personal factor aspects of industrial operations.

The engineering trained safety specialist has many new techniques to call upon in his pursuit of industry's safety objectives. Some of these new techniques are found in the areas of human factors engineering, operations research, industrial loss control, and measurement and control theory.

Human factors engineering is based on a recognition of the human as well as the engineering factors in industrial production operations. Emphasis is given to the study and solution of human problems associated with designs for mechanization, automation, and effective integration of man with his equipment and work environments.

APPLICATION OF SCIENTIFIC METHOD

Operations research involves the application of scientific methods to industrial problems. Using both theoretical and experimental models, operations research provides a scientific basis for solving complex industrial problems involving the safety aspects of scheduling, production line operations, traffic, machine breakdown, and other exigencies.

The broad concept of industrial loss control through the application of engineering methods is far-reaching and should logically become an extension of the safety specialist's activities. Both accident and non-accident industrial losses would be considered in this expanded loss prevention concept.

Included are such losses as machinery damages, increases in costs due to scrap loss, cost of reworked parts, and other losses largely the result of either acts of commission or acts of omission by personnel assigned to the multiplicity of industrial tasks. It is hypothesized that the same behavior which leads to accidents also leads to other industrial losses.

IMPROVED MEASUREMENT TECHNIQUES

Finally, a problem area implied if not explicit in all phases of engineering and accident prevention is the need for improved measurement techniques. Measurement techniques involve an understanding of the measures by which we record, predict, and control accident situations. Probably the least progress in the safety field has been made in this area.

Some questions which need answers are: How do we know when we have achieved a safe environment? How can we be certain our engineering efforts are sufficient to provide maximum safety? Are we receiving a feedback of information of sufficient quantity and quality to effectively guide us in preparing our safety programs?

More sophisticated measures of safety effectiveness are needed to enable managers to determine the results they can expect from their safety expenditures.

A brief examination of two of the areas mentioned —human factors engineering and safety measurement and control—may serve to emphasize the need for a conceptual expansion of the engineering aspects of industrial safety.

"OPERATOR ERRORS"

A close examination of unsafe conditions related to an accident will often reveal ways in which engineering can be applied to reduce the possibility of "operator errors." Many so-called "operator errors" have been touched off by faulty design or construction, prescribed operating practices that create hazards, or lack of standardization and identification which so confuses the operator that he cannot avoid making mistakes. Often potential accidents have been built into machines, equipment, and environments by a failure to properly engineer the work-place for maximum safe operation.

Human error or failure may occur in many of these situations, and environmental conditions or operating practices may predispose the worker to accidents (7). For example, the location of the power switch on many engine lathes requires the operator to reach across the revolving work piece in order to start and stop the machine. This practice continually exposes the operator to possible injury from contact with the rotating material and machine parts.

There have been many cases of an operator pushing the wrong button on an electrical control. One example occurred in a large bakery. Periodically, a man had to get into the dough mixers and clean them out. While the man was inside one of the mixers, he wanted to move the paddles very slightly. He reached out to press the inch button but inadvertently pressed the start button, and was killed (11).

HUMAN FACTORS ENGINEERING

In addition to the established methods of combating accidents such as safety education programs, special protective equipment and enforcement techniques, there is a relatively new discipline, commonly called human factors engineering, which can be used to reduce both the frequency and severity of accidents by relating the design of equipment and control of environments to the biological and psychological characteristics of the operator (8).

Human factors engineering may be defined as the application of the principles, laws, and quantitative relationships which govern man's responses to external stress to the analysis and design of machines and other engineering structures, so that the operator of such equipment will not be stressed beyond his proper limit of capabilities.

This definition implies that machines and work areas should be built around the human operator

rather than placing him in a setting without regard for his requirements and capabilities (5).

Dr. Ross McFarland of Harvard University has examined some of the safety aspects of this field (8). He has stated that machinery should be designed from the man outward, with the instruments and controls considered as extensions of his nervous system and body appendages.

More precisely stated, first, the engineer must have an understanding of the sense organs and the characteristics of human perception if satisfactory information is to be supplied in the operation of machinery and equipment. Second, the engineer must not place unreasonable demands upon the operator in regard to the physical responses involved, for example, in reaching for or operating a control or lever or in clearly differentiating between two or more controls. Third, the engineer must consider that the operator of machinery and equipment is frequently suffering from temporary impairment of functions, such as fatigue, emotional stress, and lapses of attention, with their resulting inefficiencies and operator errors. Finally, the physiological and environmental conditions such as temperature, humidity, toxic gases, and other factors must be considered or physiological limits may be exceeded (9).

ENGINEERING FOR HUMAN USE

In one sense, human factors engineering can be thought of as engineering for human use. In a more specific sense, it can be thought of as the adaptation of human tasks and working environments to the sensory, perceptual, mental, physical, and other attributes of people (6).

A first step in applying human factors engineering techniques is an advanced analysis of the equipment, the working areas, and the job requirements. If defects or stresses are present it is only a matter of time before the operator-machine-environment system breaks down and an accident occurs.

An operational job analysis should include a survey of the nature of the task, the work surroundings, the location of controls and instruments, and the way the operator performs his duties. The errors that may occur while the operator is working at a machine should be anticipated. The repetition or recurrence of near or actual accidents clearly indicates a need for re-design (8).

POTENTIALLY HAZARDOUS SITUATIONS

Most typically, attempts are made to analyze case reports of accidents in order to determine what unsafe acts and unsafe conditions led to the event (4). While it is of some help to identify these unsafe acts and unsafe conditions by means of analyses of reported accidents, it would be extremely helpful to know more about potential injury producing situations before the injuries actually occur.

In addition, lost-time injuries and other injuries included in accident reports are relatively rare events, particularly in smaller organizations. A measurement technique is needed which will allow us to detect and analyze the causal factors involved in errors and near-accidents.

A method for measuring no-injury accidents called the critical incident technique has been reported by J. C. Flanagan (3). In applying this technique a person is allowed to recall and talk at will about "near misses" in his experience on a particular job. A collection of these critical incidents from several persons performing similar tasks is used to define problem areas and to make inferences and predictions about the persons performing the acts. Such data can assist in the advance detection of accident repeaters and the elimination of accident-inducing situations before an actual major or minor injury occurs (1).

AIRCRAFT ACCIDENT STUDY

The critical incident technique has been used successfully by Fitts in his studies of pilot errors (2). He was able to identify cockpit design faults which produced errors or near-accidents in aircraft operation. In one study it was found that confusion arises when controls for operating aircraft are located too close together or are reversed from one aircraft to another. This lack of standardization often resulted in the pilot grabbing the wrong control in an emergency.

Imagine the confusion resulting when the pilot, reaching for the auxiliary fuel tank, suddenly finds he had feathered his number one engine. The critical incident technique has also been used to define problem areas and detect "near misses" in fleet motor vehicle operations (10).

The human demands of increased mechanization and automation directly concern the human factors engineering aspects of industrial safety. Currently, progress in making operations largely or completely automatic is proceeding at an exceedingly rapid pace.

REDUCE PHYSICAL EFFORTS

For the safety specialist, the mechanizing of production processes so that the physical efforts of operating personnel are reduced is a safety improvement. The human factors engineer must closely examine the demands on the operator in an automated system if he is to maximize safety effectiveness. Insofar as there is an increased need for watching and listening to what the plant or machinery is doing, automation may actually increase the total informational load on the operator.

The fact that the operator of an automatic plant is often removed from direct contact with the process he is controlling emphasizes the need to consider thoroughly what information he needs to receive in order to perform his work accurately without error or accident. He must have unambiguous indications of what is happening and of the effects of his actions, as well as data which will enable him to be sure that his apparatus is working properly.

For example, the absence of significant events in the process should not be signalled merely by the absence of any indication but, rather, by a positive stimulus which will elicit a desired accident-free or error-free response (13). These, then, represent a few of the human factors engineering problems which should be considered in any long-range program for maximizing industrial safety effectiveness.

SAFETY MEASUREMENT PROBLEM

The field of measurement and control is within the special competence of the safety engineer who has completed a contemporary industrial engineering curriculum. The safety measurement problem is probably the greatest single contemporary obstacle to immediate progress in industrial safety. We might define three basic problems which currently exist in the safety field:

1. Measurement of accidents or the measurement of safety performance.
2. Prediction of accidents.
3. Control of accidents.

In order to predict and control accidents, we first need some way to measure them. Better, more objective answers are needed to such questions as:

1. How good is our accident record?
2. Where do our accident problems lie?
3. How can we most effectively predetermine our safety budget requirements?
4. How can we best utilize our available resources to achieve maximum safety effectiveness?

An initial step toward the development of improved measuring instruments might consist of a critical examination of the objectives of safety measurement. The adequacy of any instrument of evaluation must be appraised in terms of the purpose for which it is constructed.

Regardless of purpose, however, it is possible to postulate a number of characteristics of measuring instruments which will apply to most measurement situations. Such characteristics then may be used as standards or criteria in judging the effectiveness of a presently used or proposed measurement instrument (14).

DESIRABLE MEASURING TECHNIQUE

The following are postulated characteristics of a desirable measuring technique:

1. The technique should be administratively feasible to construct and use.
2. It should be adapted to the range of characteristics to be evaluated.
3. The units of measure on a scale should be equidistant throughout the range to be evaluated. This means that the difference between successive points on the lower end of the scale should be the same as the difference between successive points on the upper end. For example, the difference between 12 inches and 13 inches is the same as the difference between one mile and one inch and one mile and two inches on a linear scale.
4. The technique should yield absolute rather than relative readings or scores. This means that the location of the zero point of the characteristic being evaluated and the zero point on the scale should coincide. For example, ten pounds is just ten pounds heavier than an object having theoretically no weight at all. Contrast this with scores obtained from measurements of intelligence. If student A scores 50 and student B scores 100, we are not necessarily justified in concluding that B knows twice as much as A.
5. The fifth characteristic of a good measuring technique is sensitivity. It must be sensitive enough to detect differences and to serve as a criterion for evaluation. We wouldn't weigh a diamond on a cattle scale, just as we wouldn't judge the effectiveness of a safety program by looking at a death rate alone.
6. The technique should be capable of duplication with the same results from the same items measured. In other words, it should be reliable or consistent over time.
7. The technique should be valid; that is, it should measure what it is supposed to measure.
8. Finally, the technique should yield readings, or scores, free from error.

What are the major difficulties with present measures of safety performance?

NEED IMMEDIATE INFORMATION

The presently used frequency and severity rates are not sensitive enough to serve as accurate measures of safety effectiveness. We need a more immediate report on the results of our prevention efforts. The frequency rate, for example, does not immediately reflect improvements in safety program activities or modifications in work environments. The smaller the sample, the less reliable is the frequency rate as a measure of accident prevention performance, particularly when less than the base number of 1,000,000 man-hours are worked during the period.

Lost time accidents, deaths, and other reportable injuries are relatively rare events. Small units may go for a long period without a chargeable accident under the present reporting system.

There are problems related to the lumping of exposures from non-parallel hazard categories into the computation of a single rate. Consideration should be given to the problem of variation in exposure to different environmental hazards.

A single severe injury or death will drastically alter the severity rate in smaller organizations and thus it may not reflect overall accident prevention efforts and accomplishments.

Many accidents, particularly the less severe ones, are never reported. Information valuable for analysis and control purposes is thus frequently not included in the presently used measurement system.

MORE SOPHISTICATED METHODS

Better measures of engineering quality are needed. How do we know what degree of safety is actually present in a given environment? What is the criterion for a safe plant? How can we be sure our engineering efforts are sufficient to provide maximum safety? We need more sophisticated measures of safety effectiveness to tell us what we can expect from our efforts.

Measures are needed which are sensitive to non-injury accidents. This would be particularly valuable

in hazard categories where the results of accidents exist on a continuum from no injuries or "near misses" to disabling injuries and even deaths. Accident causal factors revealed by an analysis of non-injury or low severity accidents could be used to guide our accident control activities.

Measures are needed which will enable us to quantify personal factors influencing industrial safety effectiveness. Objective techniques are needed for use in evaluating the influence of top managers, first-line supervisors, and union leaders on the workers' safety effectiveness. Some method is needed which will enable us to measure the interactions of individuals in these positions with the industrial workers, in a given industrial climate.

SOLUTIONS MUST BE FOUND

Solutions to these measurement problems should be sought by the safety engineer if the prediction, control, and ultimate optimization of safety success is to be achieved.

It has been suggested that the primary approach to the achievement of safety success should be to engineer environments so that accidents cannot occur or will not have severe results in spite of thoughtless acts by individuals.

A first step toward optimizing safety success is the application of environment modification or engineering techniques. Regardless of the attention given to other phases of an accident prevention program, if hazardous conditions continue to exist, human failures will eventually produce accidents.

While certain industries may require specialized engineering training for their safety specialists, it has been suggested that the contemporary college industrial engineering curriculum provides the best preparation for general safety engineering work. This course is designed to integrate systems of men, materials, and equipment, and to specify, predict, and evaluate the results to be obtained from such systems.

ACCIDENT PROBLEM PERCEPTION

The practicing safety engineer is expected to possess as a result of his training and orientation, an accident problem perception capability which will enable him to recognize situations where engineering solutions can be applied. The main justification for his existence rests with his ability to recognize problems and provide decision-making information for line management so that managers, being in direct control of the operating functions, can direct the accomplishment of the solutions.

We have barely scratched the surface in the application of engineering techniques to industrial safety problems. We should now direct our attention toward making the conceptualization of the safety engineer's work more explicit. What are the next steps?

Curriculum content with regard to safety engineering training should be explicitly defined. The responsibility of education should be to provide a sound basic engineering course with emphasis on human behavior as an important component of the industrial man-machine-environment system. The existing industrial engineering curriculum has been suggested as a framework for the academic development of future industrial safety engineers.

New areas such as human factors engineering, industrial loss control, and operations research should be explored to determine how they may best contribute to the furthering of safety accomplishment.

Continual attention should be given by the safety engineer to the development of improved measurement techniques so that accident prediction and control can be maximized.

And finally, research should be conducted to develop new techniques, new approaches, and sound data which will reveal the truths of the industrial accident phenomenon. As the methods of production become more complex, research results should be ready to provide the guidance needed for optimum safety success.

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Pressure Vessel Accidents
. . . HOW TO PREVENT THEM!

by A. I. SNYDER

THE ENTIRE FIELD of Boiler and Pressure Vessel Accidents is much too broad to cover in this limited space. For this reason my approach in this paper will be to review very briefly and in general, pressure vessel hazards, and then review several accidents which have actually occurred, explaining either how they could have been prevented, or what is being done to prevent their recurrence. For the purposes of this paper, I shall include boilers under the broad terminology of pressure vessels.

Pressure vessels contain potential energy while in operation. The magnitude of this energy may vary from almost zero to magnitudes which are difficult to calculate. For example, a tank of water at atmospheric temperature and pressurized to 150 psi contains little or no energy—and it is for this reason we normally use water for testing pressure vessels. On the other hand, the same tank full of water at 350° F and 150 psi would contain potentially destructive energy equal to the total btu's stored in the water above 212° F. If the tank contained 100 gallons of water it would contain approximately 114,000 btu's which would have a mechanical equivalent of some 90,000,000-foot lbs. of energy.

If we then consider the vast number of products stored and transported under pressure, and the varied conditions under which they are stored, we begin to visualize the magnitude of the safety engineer's job in the field of pressure vessels.

Many years ago pressure vessels failed mainly because of any one of a number of reasons—poor design, improper construction, unsuitable materials, improper installation, inadequate maintenance, faulty operation. Through the efforts of the ASME Boiler and Pressure Vessel Committees and the National Board of Boiler and Pressure Vessel Inspectors' Association, failures due to poor design, improper construction and unsuitable materials have practically disappeared.

If a vessel is constructed, inspected and stamped as required by the ASME and National Board standards, one can be reasonably certain it will be safe to operate in the service for which it was designed—always of course provided it is properly installed and maintained. I would like to emphasize the words *"in the service for which it was designed"* and point out that from a safety standpoint this is an important item well worth noting.

For example, the water tank referred to previously, even if built Code, still would not be considered suitable for containing radioactive water at the 350° F which might be found in nuclear installations. Nor would it necessarily be considered acceptable for use as an electric boiler operating at the same pressures and temperatures.

Improper installation has also been largely eliminated, especially where vessels are required by various laws and ordinances to be inspected periodically.

However, improper operation and maintenance still present a problem. It is in those areas that we must concentrate our efforts if we are to appreciably reduce pressure vessel accidents.

Why is the accident rate higher in these areas than in some others. I believe there are several reasons:

In our rapidly advancing technological age, pressure vessels are used in many new processes and some of these processes present new hazards that require new and untried operating and maintenance procedures.

Operating and maintenance personnel are being transferred to new and more complex processes without adequate training or knowledge of the inherent hazards of the new processes.

Automatic controls are being substituted for human operators without adequate schedules for maintenance of these controls.

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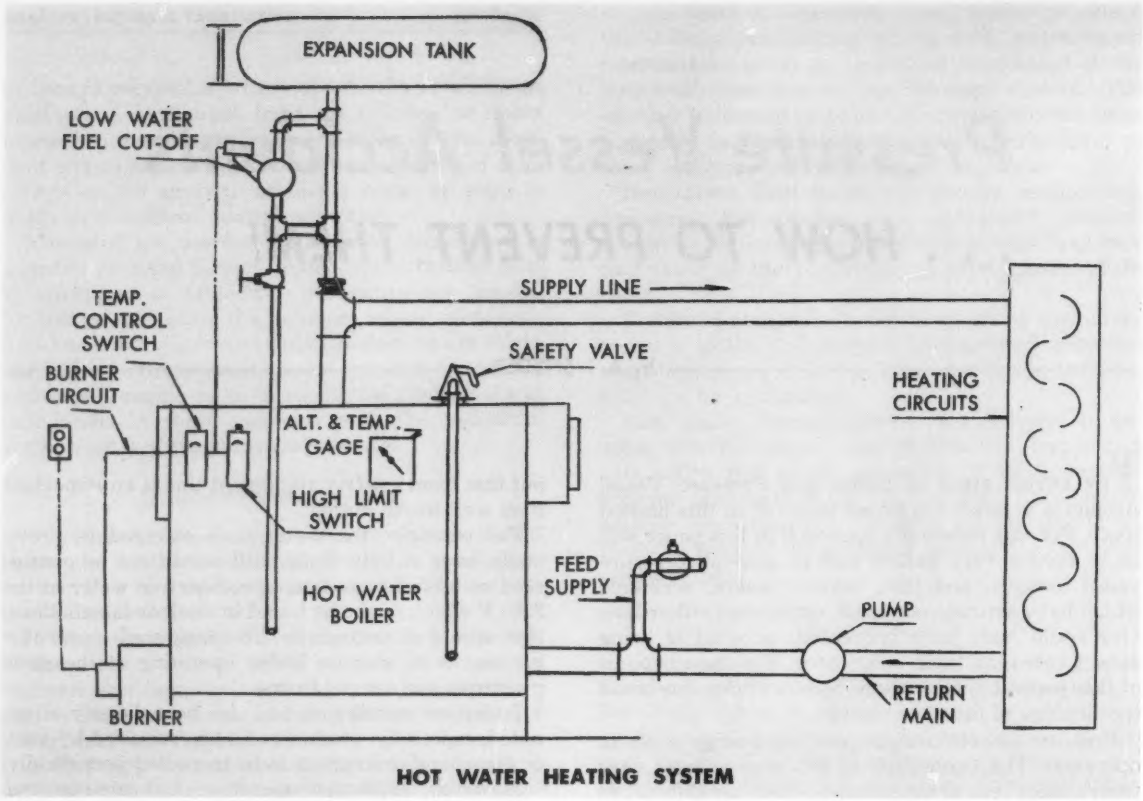


Figure 1

Existing vessels are being used for different purposes than those for which they were originally designed, and are often improperly altered by unqualified personnel for the new use.

The boiler and pressure vessel inspection required by most regulations normally includes only the pressure vessel and does not include the process in which it is being used.

Human factors are present which are difficult to anticipate and control.

Most of these factors have contributed to the accidents I will now review, to illustrate some of the problems in pressure vessel safety.

The first accident involves a hot water heating boiler. Many accidents involving pressure vessels of this type occurred a few years ago, and there are indications that similar accidents are still taking place.

A school's heating system had been shut down for the Easter vacation. About 9 A.M. after the vacation, the custodian lighted the boiler so that the system would be ready to supply heat if the temperature dropped. At about 10:30 A.M. the boiler exploded.

Fortunately there were no injuries other than slight cuts from flying glass and plaster. However, if the accident had occurred while the children were out in the schoolyard for recess, it would probably have been a catastrophe. The boiler room walls and parts of the boiler were strewn over a large portion of the schoolyard.

Let us now examine this heating system, to better understand just what occurred. (*See Figure 1.*) There was, of course, a boiler. In this particular installation, the boiler was a Code cast iron hot water heating boiler operating at 12 psi with the safety valve set to open at 30 psi. It was fired with natural gas through two separate burners. Each burner was equipped with two pilot flames. One pilot on each burner was of the self-energized type and so arranged that it would put out the main burner in case that pilot was extinguished. The other pilots were constant flame pilots only.

There was an aquastat installed to control the operation of both burners to maintain the water in the boiler within predetermined temperatures. In addition, the burner gas valves were each equipped with a high-temperature control designed to cut off the burner if the operating aquastat failed. It should be noted that the operating aquastat functioned electrically, and the high-limit control was designed

to function mechanically through a capillary tube arrangement.

There was a Code safety valve installed, and also a pressure or altitude gauge and an indicating thermometer.

In addition there was an automatic water feeder set to feed water into the system if the water dropped below a predetermined level, and another device to feed water into the boiler if the pressure in the system dropped below 5 psi.

There was, of course, the necessary expansion tank designed to permit expansion of water due to temperature changes.

Actually a system of this type is in reality two systems. One of the systems consists of the boiler and necessary appurtenances, which furnishes a reservoir of heated water. The other system consists of the circulating pump and the distribution piping necessary to conduct the heated water to areas where heat is required.

CIRCULATING SYSTEM NO PROBLEM

In investigating this and similar accidents we have noticed no difficulties with the circulating system, and therefore I shall not describe that system in detail.

Our investigation of the accident we are discussing disclosed the following significant facts:

The atmospheric temperature had not dropped below the thermostat setting in the various rooms before the explosion. Therefore, the circulating system had not been called upon to operate and no heat had been withdrawn from the boiler prior to the accident.

The burners on the boiler had a combined btu input of 1,080,000 btu/hr.

The safety valve capacity was 291,300 btu/hr.

The custodian claimed the expansion tank was at least ¾ full of water when he lighted the boiler.

The custodian had lighted the boiler by manipulating a manual by-pass mechanism on the burner which should permit the boiler to become automatically controlled after the burner valves had been electrically energized for about three minutes.

The custodian believed he had energized the burner electrical circuit.

The high-temperature control had never been connected on either burner.

The school district had a maintenance contract which they thought covered the boiler controls. However, that contract only covered the circulating system.

The water pressure in the system supplying this boiler varied from 35 psi to 50 psi.

THREE UNSAFE CONDITIONS

This information pointed up the fact that there were at least three unsafe conditions at the time the boiler was lighted and possibly one unsafe act committed.

The safety valve was not sufficiently large to relieve all the heat that could be generated if a runaway burner condition developed. In fact, the safety valve was only about ⅓ large enough for this boiler.

There was insufficient capacity left in the expansion tank to allow for thermal expansion of the water in the boiler from ambient temperature to 250° F. The tank should actually have been only about ¼ full of water when lighting off.

The high-temperature controls had not been connected into the system. In fact, these controls were found with the capillary tubes neatly coiled and tied with red ribbons, just as they had left the factory.

The unsafe act involved the practice of lighting the burner by means of the manual by-pass. Although it requires a few minutes longer, it is much safer to permit the burners to come on automatically. Even assuming that the custodian did energize the circuit by manipulating a switch, there is still the possibility of a fuse or circuit breaker being out that would permit the circuit to be de-energized and if the circuit is not energized electrically gas burners of this type remain on at full flow indefinitely if lighted by means of the manual by-pass.

It should also be noted that when the pressure in the boiler built up above 35 psi water could not be fed into the boiler, because the pressure in the boiler could then exceed the water supply pressure.

After investigating this accident, we were faced with the problem of preventing similar accidents—the main purpose of accident investigations. We made spot inspections of other boilers in schools, and found the same or even worse conditions existing. So, although our laws do not require periodic inspection and permits to operate low-pressure boilers of this type, we instructed our field engineers to inspect the boilers at all schools and places of public assembly.

MINIMUM STANDARDS ESTABLISHED

We also called a meeting of all State agencies having jurisdiction over schools and places of public assembly, and jointly developed a set of recommended minimum standards for controls for low-pressure boilers and heaters.

Before our inspection program was completed there were two more explosions of similar boilers in other schools. I am happy to say, however, that there have been no such boiler failures in our schools since our inspection was completed. We have had a few furnace explosions, but no boiler failures.

Our recommendation for minimum controls for such boilers include the following points:

Each such boiler shall be fitted with an ASME safety valve or valves having a total btu rating of at least equal to the btu output rating of the boiler. This device shall prevent the rise of pressure in the boiler of more than 3 psi above the set pressure of the safety valve when the fuel burning equipment is operated at maximum capacity.

All automatically controlled boilers shall be equipped with a low-water control that will shut off fuel to the burner when the water drops below a predetermined level.

All automatically controlled boilers shall be equipped with an adjustable operating temperature control to regulate flow of fuel to the burner, to maintain the operating temperatures within predetermined limits not to exceed 250° F.

All automatically controlled boilers shall be equipped with a high-limit temperature control that will shut off fuel to the burner when the temperature in the boiler reaches a predetermined maximum, not to exceed 250° F. The fuel control valve or high-limit mechanism shall require manual resetting when it operates due to the high-temperature condition.

All electrically operated fuel valves shall be of the normally closed type which will open only when energized electrically.

All boilers shall be equipped with a water pressure or altitude gauge and a thermometer to indicate the pressure and temperature in the boiler. These devices shall be readily visible from the operating level.

SAFETY PILOT REQUIRED

All automatically controlled gas fired boilers shall be equipped with a full safety pilot that will shut off the gas to the main burner and pilots in the event one or more pilot lights go out

All water heating boilers shall be equipped with a suitable expansion tank that will be consistent with the temperature, pressure and capacity of the system. Where practicable, this tank shall be installed at the highest point in the system.

All controls shall be set and adjusted by an authorized representative of the boiler manufacturer or burner control manufacturer, and a complete control diagram of legible type, together with an operating manual giving complete boiler instructions, shall be furnished by the installer for each installation. Operating personnel shall be required to become thoroughly familiar with these operating instructions before they are allowed to operate the boiler plant.

New boilers of this type are inspected by certified inspectors before being placed in service.

It was recommended that boiler makeup water be introduced into the system through the water return connection, by means of a pressure regulator set to maintain a minimum cold hydrostatic pressure of approximately 5 psi at the highest point in the system.

In addition, it was recommended that automatically controlled boilers be equipped with an automatic water feeder that would maintain the water level in the boiler within the predetermined operating range.

OTHER RECOMMENDATIONS

We also recommended that fuel valves with manual by-pass should not be used unless the by-pass mechanism is of the constant pressure type.

We believe the manual reset mechanism on the high-limit control is extremely important, because it calls the operator's attention to the fact that the operating control has malfunctioned thus prohibiting the continued operation of the boiler with the high-limit control functioning as the operating control until the high-limit control also becomes inoperative and malfunctions.

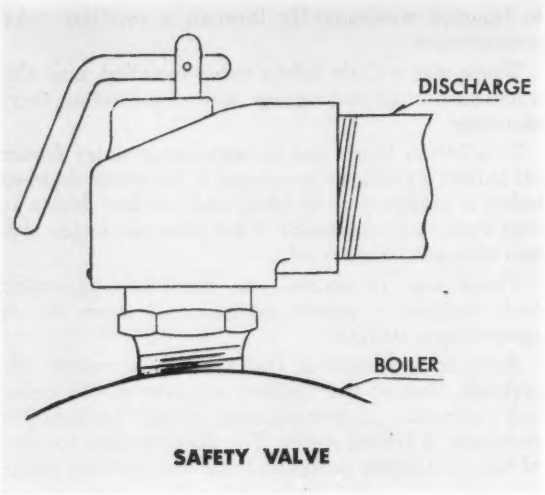


Figure 2

I would point out that we had some opposition to this requirement for a manual reset, particularly from those areas where electrical outages are not uncommon. With this arrangement, where the high-limit control is electrically operated and an electrical outage occurs, the control must be reset manually before relighting. If this happens during the night, the school will be cold in the morning. However, we believe that a cold school is better than no school.

We also found the electric companies most cooperative in notifying the school custodians in cases of electrical outage so they could reset their controls. Then, too, there are controls available in which the high-temperature control does not function electrically.

LOW PRESSURE BOILER DEFECT

While these comments refer only to hot water heating boilers, it might be well to point out that during our survey of school boilers we also found one unsafe condition in a number of low-pressure steam heating boilers. A number of these boilers are fitted with safety valves of the type that have the spring adjustment made by tightening down on the bonnet to increase spring tension. *(See Figure 2.)*

In the factory this adjustment was sealed with a drive pin through the bonnet into the valve body. However, we found that in many of these valves the pin had been sheared and the spring was completely compressed, acting as a very effective gag.

Apparently in installing this safety valve, the installation mechanic had used a pipe in the safety valve discharge rather than a wrench to screw the valve into the boiler setting. This resulted in the valve and valve adjustment both being tightened. The National Board took this up with the manufacturer and we are advised that that type of safety valve is no longer being made. However, if you encounter this type valve on existing installations I would suggest you check to make certain it will operate.

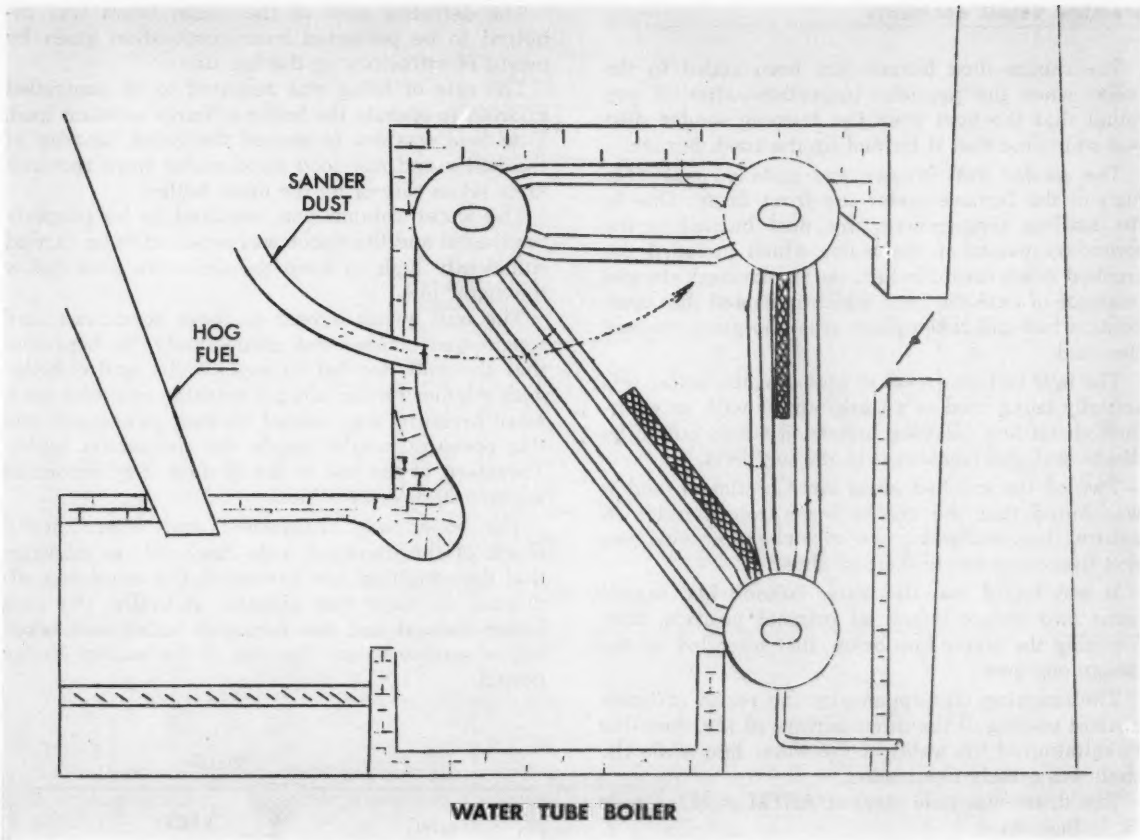


Figure 3

The next accident I have selected involves a high-pressure water tube boiler. The boiler was a three drum type having some 6,000 square feet of heating surface, operating at 200 psi, and of welded construction. You may not consider this an accident since the boiler was not torn asunder into two or more parts. However, it was certainly an unplanned incident and, therefore, in my opinion on accident.

The boiler in question was located in a plywood plant in a small lumber town. There were two boilers installed in battery, both of which were required to operate the mill. The companion boiler was built for 250 psi, but that difference in pressure had no bearing on the accident.

CIRCUMFERENTIAL CRACKS NOTED

Just before Christmas the boiler was shut down for the annual internal inspection. The certified inspector for the insurance company made the inspection and found an area in the steam drum having numerous circumferential cracks. *(See Figure 3.)* This area was right at the water line and extended longitudinally for about seven feet. In other words, over a seven-foot length a total of 164 circumferential cracks were counted on the water side at the water line, the cracks varying in length from about one to four inches, and in depth from little more than surface cracks to one that penetrated the entire 7/8-inch plate thickness.

The inspector found a number of roof or equalizing tubes badly distorted, and noted that a sander dust burner had been added to the original wood chip fuel supply since the previous inspection.

DRUM REPAIRS COSTLY

He did not believe the drum could be economically and permanently repaired, and contacted his supervising inspector to confirm his judgment. His supervisor, agreeing with him, contacted our office to see whether we would permit a temporary repair to allow the boiler to operate until a new drum could be obtained.

The supervising inspector and I flew up to see what could be done to keep the plant operating. We went to look personally because we wanted to be reasonably certain that we understood just why the incident had occurred and agreed that no repair should be made until the causative factors had been determined. We also wanted to be certain that the adverse conditions were corrected before any repair was permitted. Also, if w were to permit a temporary repair, we wanted t personally see the defect and confirm the field inspector's findings.

Our investigation disclosed the following significant facts:

This boiler had been designed and installed to burn wood chips (or "hog fuel" as it is known in the lumber industry).

The sander dust burner had been added to the boiler since the previous inspection—after it was found that the heat from the burning sander dust was so intense that it burned up the trash burner.

The sander dust burner was installed relatively high in the furnace under the front drum. Due to the baffling arrangement, this dust burned in the secondary passes of the boiler which included the cracked steam drum. In fact, the smoke stack showed evidence of extreme heat, which indicated that combustion had still taken place after the gases reached the stack.

The mill had an excess of fuel, and the boiler was actually being used as a trash burner with an eight-inch steam line carrying unneeded steam out to be discharged and condensed in the log pond.

Two of the cracked areas were sectioned, and it was found that the cracks were transgranular in nature, thus confirming the overwhelming evidence that they were due to thermal abuse.

It was found that the water column had sagged some two inches below its original position, thus lowering the water line below that intended by the design engineer.

The cracking was apparently the result of intermittent cooling of the inner surface of the shell due to agitation of the water at the water line while the shell was grossly overheated.

The drum was mild steel of ASTM A-212, Grade B, 7/8-inch thick.

For some unknown reason, in the design of this boiler one row of tubes had been omitted midway of the length of the drum, and it was in that gap that the worst cracking had occurred.

It would require some 30 days to obtain a replacement drum.

TEMPORARY REPAIR ALLOWED

After carefully evaluating all of the above factors it was agreed that a temporary repair would be allowed to permit the boiler to operate for 30 days with the following stipulations:

The crack extending through the shell was to be prepared for double-V welded repair.

About 70 of the most severe cracks were to be ground to remove the crack and the groove was to be checked by magnetic particle or dye penetrant methods of non-destructive testing to make certain the crack had been completely removed. (Dye penetrant was used in the repair)

The grooves could then be welded by a qualified welder using a small rod and mechanically peening between passes.

The above repair was required to be made under the personal supervision of the certified inspector for the insurance company.

The sander dust burner was required to be removed from the boiler.

The most badly distorted tubes were required to be replaced before returning the boiler to service. The other tubes were permitted to remain in place until the new drum was installed.

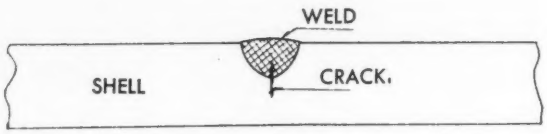
The defective area of the steam drum was required to be protected from combustion gases by means of refractory on the fire side.

The rate of firing was required to be controlled in order to operate the boiler at fairly constant load. That load was not to exceed the rated capacity of the boiler and any load fluctuations were required to be taken care of by the other boiler.

The water column was required to be properly readjusted and the water was required to be carried sufficiently high to keep the defective area below the water line.

The mill owner agreed to these conditions, and repair was commenced immediately. It happened that the mill decided to replace the entire boiler with a boiler having 250 psi working pressure since more pressure was needed in their operations and this pressure would match the companion boiler. Therefore, at the end of the 30 days they requested another 30 days extension.

The boiler was reinspected, and when careful check of the damaged area disclosed no evidence that the condition had worsened, the requested additional 30 days was granted. Actually, the new boiler arrived and the damaged boiler was taken out of service before the end of the second 30-day period.



BOILER SHELL

Figure 4

As a matter of interest, the insurance company sectioned the drum after it was removed and found that in almost every case the crack that had been repaired had reappeared at the root of the weld and was progressing into both the base metal and weld metal. This certainly confirmed the inspector's judgment that permanent repair entailing only the welding of the cracks would not have been a safe procedure. *(See Figure 4.)*

This accident serves to illustrate the fact that many boilers are designed and installed to use a designated fuel and burner arrangement. One should analyze an installation very carefully before changing fuel or burner arrangements. In fact, we suggest that such proposed changes be submitted to and approved by the boiler manufacturer before any changes are made.

This is particularly important with water tube boilers because many such boilers require different baffling arrangements for different fuels. Also, the method of introducing primary and secondary air must often be changed in order to eliminate furnace explosions.

Let us now look at some accidents involving unfired pressure vessels. The first accident I have

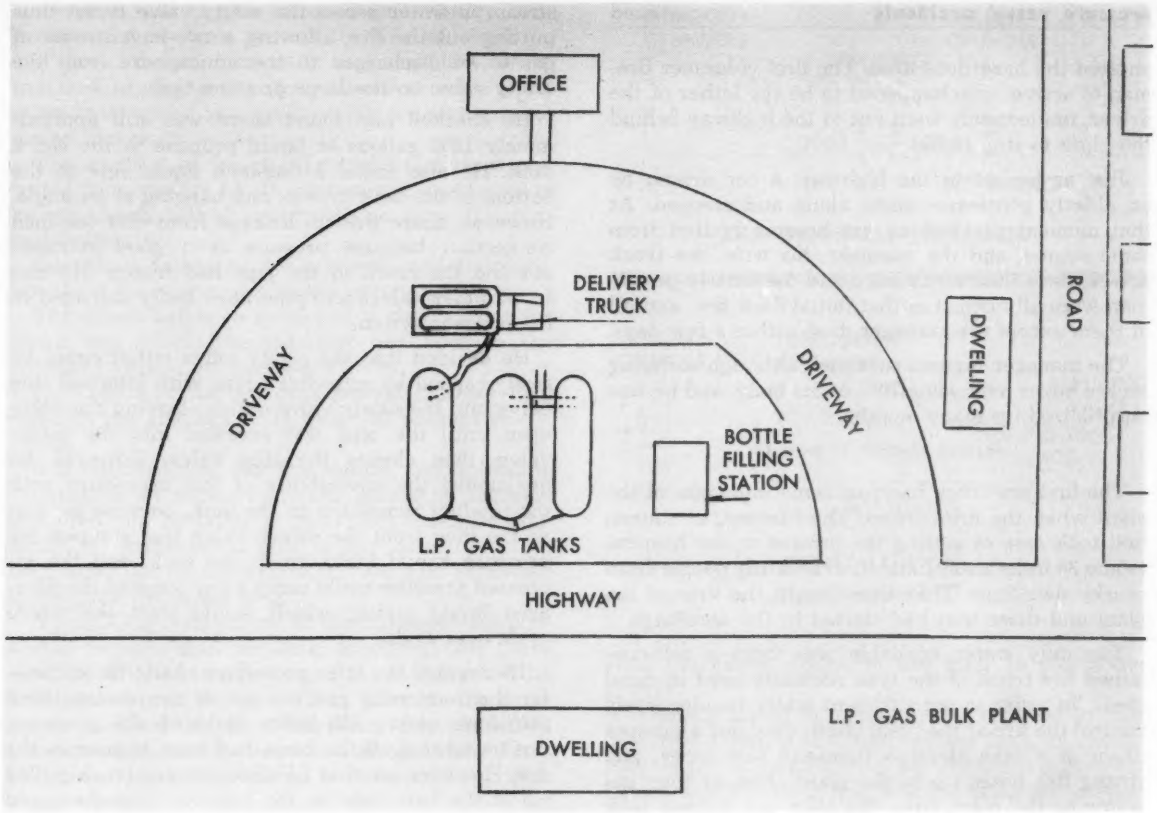


Figure 5

selected involves an LP-Gas plant. *(See Figure 5.)* LP-Gas is a flammable petroleum product and consists predominantly of butane and propanes or mixtures of these two products.

This product is a gas at normal atmospheric temperature and pressure, but is capable of being liquefied by lowering the temperature or raising the pressure. Therefore, it is usually transported and stored in the liquid state at atmospheric temperatures under pressures of from about 60 psi to 200 psi depending upon the particular product and the atmospheric temperature.

PERMITTED IN CALIFORNIA

In California this product is permitted to be transported in bulk tank trucks and transferred to customer bulk tanks on the customer's premises—a practice that is not permitted in some of the Eastern states.

The plant in question was located in mountainous country about 125 miles north of San Francisco. There were three storage tanks at this bulk plant, one about five feet in diameter by 35 feet long, the other two about seven feet in diameter by 30 feet long. The product stored in the first two tanks was predominantly propane, the third tank containing a product predominantly butane. Next to the smaller tank there was also a cylinder filling platform for filling ICC cylinders.

On the morning of the accident, which occurred in mid-July, a bulk delivery truck had connected up to the butane tank and loaded. The delivery truck was of the so-called twin tank type having two tanks mounted side by side, each tank having a capacity of about 800 gallons.

The driver finished filling his truck at about 9 o'clock and apparently just as he finished filling, and before he disconnected his filling hoses, he was called to the telephone. After completing the telephone call he came from the office, got into his truck and started to drive away with the hoses still connected.

Apparently the two-inch liquid connection was pulled out of the bottom of the storage tank; the one and one-quarter-inch vapor connection on the top of the tank was cracked where it screwed into the tank; and the two-inch liquid filling line on the truck was broken where it screwed into the two-inch pipe tee connecting the liquid outlets from the twin tanks.

While being transported to the hospital later, the driver said that the hose had broken and that he and the plant manager had waded into the fog-like blanket of butane to try to shut off the flow. Apparently they did not realize that the connection had been pulled from the tank.

The manager's wife apparently called the fire department (a volunteer department) and then also

entered the hazardous area. The first volunteer fireman to arrive, who happened to be the father of the driver, immediately went out to the highway behind the plant to stop traffic.

Just as he got to the highway, a car driven by an elderly gentleman came along and stopped. At that moment the leaking gas became ignited from some source, and the manager, his wife, the truck driver, the volunteer fireman and the elderly gentleman were all burned in that initial flash fire; and all of them except the manager died within a few days.

The manager himself survived, although suffering severe burns over some 70% of his body, and he was hospitalized for many months.

INJURED REMOVED TO HOSPITAL

The first fire truck had just come into sight of the plant when the fire started. The firemen, of course, first took care of getting the injured to the hospital (some 30 miles away) and in evacuating people from nearby dwellings. They then fought the fires at the plant and those that had started in the dwellings.

The only water available was from a self-contained fire truck of the type normally used in rural areas. In order to get sufficient water to adequately control the fire at the plant itself, they put a pumper down at a lake about a thousand feet away, and strung fire hoses up to the plant. Just as they got water to the plant from the lake, the butane tank exploded.

In the approximate 20 minutes that had elapsed, the truck tires and other ignitable portions of the truck were burning fiercely. So was the gas escaping from the loading connections on the truck. The safety valves on both tanks on the truck and also on the No. 2 propane storage tank had opened, and this gas was also burning.

At this point the firemen were able to properly control this fire. They let the fire burn, as there was no serious flame impingement on any of the tanks, and they spent their time and efforts to control the fire and keep it confined to the plant.

The truck burned itself out about noon, and that only left the fire burning from the safety valve of the No. 2 propane storage tank. Apparently the fire had been so intense that the pressure in that tank built up considerably above the design pressure, and the resultant high velocity of gas through this valve had carried away the valve disc.

ENGINEER SENT TO SCENE

It was about 1 p.m. when we received the first word of this accident in a telephone inquiry asking how to secure this plant safely. Because the person calling did not know how much product remained in the tanks or what the condition of the outlet connections were, we advised him to allow it to continue to burn, and said we would send an engineer up to assist them.

Our engineer arrived about 4 p.m. and found that during the afternoon the firemen had whipped a stream of water across the safety valve outlet thus putting out the fire, allowing a two-inch stream of gas to be discharged to the atmosphere from the safety valve on the large propane tank.

He checked and found there was still approximately 1205 gallons of liquid propane in the No. 2 tank. He also found a one-inch liquid line in the bottom of the tank broken and hanging at an angle. However, there was no leakage from this one-inch connection because propane is a good refrigerant and the crack in the pipe had frozen. He also found other valves and pipe lines badly damaged in the propane system.

He decided that the safety valve outlet could be easily capped by screwing a pipe with attached stop valve into the safety valve outlet—leaving the valve open until the pipe was screwed into the safety valve, then closing the stop valve. However, he questioned the advisability of this procedure with the product remaining in the tank, because as soon as the flow from the safety valve was stopped the pressure would build up in the tank, and the increased pressure could carry away some of the damaged liquid piping, which would start the whole cycle over again.

He decided the safer procedure would be to transfer the remaining product out of the storage tank into some empty 250-gallon tanks on the premises, but found that all the hoses had been burned in the fire. However, another LP-Gas delivery truck pulled up at the barricade on the highway just then, and the hoses were "borrowed" from that truck to transfer the product to the smaller tanks. As soon as the transfer was started the safety valve was capped. The transfer was completed and the plant secured about 8 p.m. without further difficulty.

RESULTS OF INVESTIGATION

Our investigation disclosed the following:

The plant had been installed and placed in operation without the required inspection and permit to operate from our office.

The liquid and vapor connections on the butane tank were unsupported or at best, poorly supported.

The truck had apparently been moved before disconnecting the hoses; this pulled the liquid line out of the storage tank, broke the vapor line on top of the tank, and broke the liquid loading line on the truck.

The loading valves on the truck tank had not been closed before the accident.

There was no evidence of wheel blocks on the vehicle or on the premises.

Fire from the broken vapor connection on the top of the butane tank had burned down along the top of the tank, overheating the metal and causing the tank to rupture. This was evident by the nature of the fractured metal.

The truck tank nearest the storage tanks was empty and the other truck tank was approximately ¼ full after the plant was secured. This would indicate that there had been insufficient flow through either of the excess-flow valves to cause them to

close until one of the tanks became empty. The pressure in the tank nearest the fire had built up and forced the product out of that tank first. When that tank became empty, the excess-flow valve in the other tank closed and confined the remaining product to that tank.

The smallest of the storage tanks had been protected from the fire by its location and was found to be completely full of liquid with no room for thermal expansion.

The exact source of ignition was undetermined, but there were several possible sources.

The driver had been employed in this position for about two years. The manager had been in the LP-Gas business for over eight years.

As a result of this accident several changes were made in our regulations in order to prevent recurrences.

It is required now that the loading and unloading connections at all bulk storage plants be securely anchored into concrete or equivalent bulkheads designed to withstand a pull in any direction of at least 2000 lbs. These bulkheads are not permitted to be underneath the tank.

If the filling connections at the bulkhead are connected to more than one tank, an excess-flow valve must be installed in this line on the tank side of the bulkhead—unless the excess-flow valves in the tanks are so designed that they will close when the filling connections at the bulkhead and all the tank valves are open. This is required in both liquid and vapor connections.

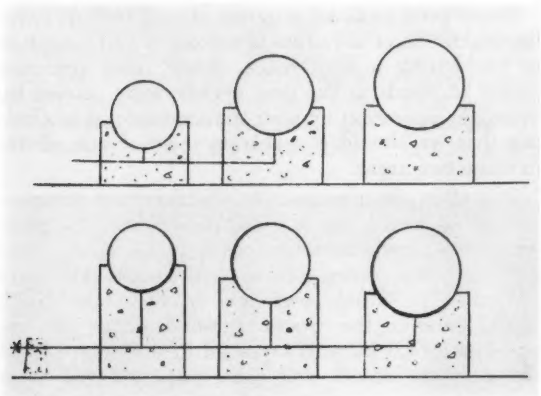


Figure 6

All storage tanks installed in battery of two or more tanks must be installed with the tops of the tanks in substantially the same horizontal plane. Technically, the required outage level should be in the same horizontal plane. *(See Figure 6.)*

We strongly recommend that all connections other than the safety valve and gauging connections come from the bottom of the tank. If the vapor line on the ruptured butane tank had been on the bottom of the tank, the tank would probably not have ruptured.

All safety valves on storage tanks over 1200 gallons capacity are required to have standpipes installed not less than two feet in length but in no case

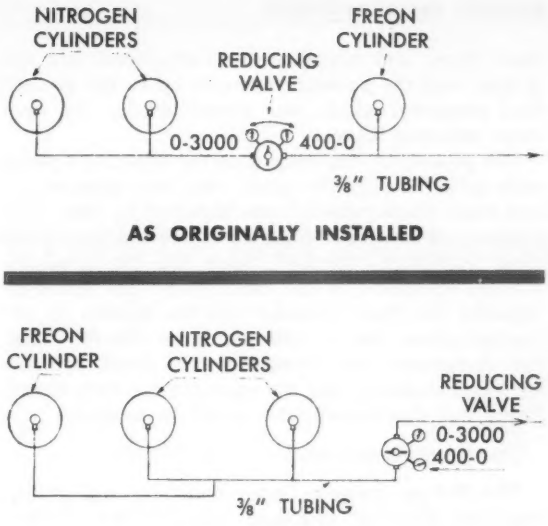


Figure 7

shall the valves discharge less than 10 feet above ground.

Where a liquid or vapor line is reduced in size, or where it joins a line from another tank, an excess-flow valve is required to be installed unless the excess-flow valves in the tank are designed to operate with the reduced flow.

How large must a vessel be in order to create a hazard?

I have chosen the final accident because it involves a rather small vessel. Many people are of the opinion that a small pressure vessel is not hazardous, a fallacy which I believe this accident will illustrate. Though it is true that the magnitude of energy stored in the vessel is a function of size, one should not harbor the belief that size alone is the governing factor.

This particular accident occurred in a manufacturing plant which used a process requiring the mixing of nitrogen and freon in relatively small quantities. The gases were purchased in and used from ICC cylinders. The freon cylinder was about 10 inches in diameter and constructed according to ICC specification 4-BA. The two nitrogen cylinders were seven-inch diameter and constructed according to ICC specification 3AA. The vessels had allowable working pressures of 300 psi and 2265 psi respectively.

They were originally installed in such a way that the two nitrogen cylinders were manifolded together, with a double-reducing valve arrangement that reduced the pressure down to the desired pressure somewhere below 150 psi. The freon cylinder was then connected into the line on the low-pressure side of these reducing valves, with the flow of freon into the system controlled manually. *(See Figure 7.)*

In operation, freon was fed into the system manually until a predetermined initial pressure built up, as indicated by a pressure gauge. The freon valve was

then closed and nitrogen was introduced into the system, and the pressure brought up to the desired final pressure, which was controlled by the final stage reducing valve.

The procedure had been used for about two years with no difficulty. The plant was then rearranged, and when these vessels were installed in their new location the employee assigned to operate this equipment apparently decided there was no need for manual operation of the freon valve. He therefore installed the freon cylinder into the system on the high-pressure side of the regulator. Shortly after the changeover was completed, the freon cylinder exploded violently, and the operator instantly killed. There was also considerable property damage.

Our investigation disclosed the following:

The 300 psi freon cylinder had been manifolded with the 2265 psi nitrogen cylinder without provision for preventing the over-pressuring of the freon vessel.

There were no safety valves in the system except for a safety valve on one of the nitrogen cylinders. This valve was set to open at about 2300 psi.

The relieving devices on the freon cylinder consisted of fusible plugs only.

Apparently when the changeover was made, the nitrogen cylinders were only partially charged, and consequently contained that product at a pressure somewhat less than the bursting pressure of the freon cylinders. This would seem to be true because the system operated in this fashion for several weeks with no difficulty, although I would question the quality of the final mixture of these two gases during that time.

The nitrogen cylinders had just been replaced with freshly charged cylinders when the freon exploded. The freshly charged cylinders were pressurized to about 2200 psi, which was approximately twice the theoretical bursting pressure of the freon cylinder.

Our recommendations for preventing recurrences of this type of accident are:

Safety valves or other relieving devices should be installed on all pressure vessels to protect them from over-pressure.

Pressure vessels should not be installed into systems with other vessels operating at higher pressures unless adequate reducing valves are installed to reduce the pressures to not more than the allowable safe working pressure of the weakest vessel or device used in the system.

Where pressure reducing valves are used, safety valves should be installed in the low-pressure side and should have a relieving capacity at least equal to the maximum flow through the reducing valve.

In summary then, it should be remembered that all pressure vessels are potentially hazardous. Pressure vessels should be constructed according to some known and acceptable standard. Acceptable standards in this country are the ASME Boiler and Pressure Vessel Code standards and the ICC standards, and vessels built to either of these standards are safe to operate in the services for which they are designed.

All pressure vessels should be fitted with adequate pressure relieving devices to prevent over-pressure. Pressure vessel safety does not always end at the pressure vessel, but should often include the system into which the vessel is installed.

Operating personnel should receive proper instructions for the safe operation of both boilers and pressure vessels and they should be made aware of the degree of hazard involved, particularly in relation to new processes. All pressure vessels should be properly maintained, with adequate inspection programs set up to make certain the vessels have not deteriorated due to corrosion, erosion, thermal abuse or other factors to the point where they are no longer safe, and that operating controls are functioning properly.

OTHER RECOMMENDATIONS

When a vessel is transferred to a different service it should be critically reviewed to make certain it is safe to operate in the new service. When alteration is necessary the alteration should be made in accordance with the standard to which the vessel was designed. If the vessel happens to be a non-code vessel, the standards of the Code are reasonable standards to be used for the alterations. However, one should be cautioned that alteration according to the ASME Code still does not make such vessel a Code vessel.

Every good accident program should include careful evaluation of the cause of accidents and a method of preventing a recurrence. Since most pressure vessel accidents in the past decade were caused by improper operation or poor maintenance, it is obvious that we should concentrate most of our efforts in those two areas.

Too often the pressure vessel inspector concerns himself only with the physical condition of the pressure vessel itself, and assumes that the safety engineer or some other person will check the other hazards. The safety engineer, on the other hand, often assumes the pressure vessel inspector has checked for all hazards involved in the operation of the pressure vessel, and consequently these areas are allowed to remain a kind of "no man's land."

Therefore, we must require that the pressure vessel inspector evaluate these other hazards during his inspection, or we must work very closely with safety engineers who inspect for general hazards to have a firm understanding as to just who will evaluate those hazards.

Perhaps we, as members of the National Board, should explore the possibility of working jointly with some national organization such as the American Society of Safety Engineers to eliminate the hazards causing present accidents—much as we have worked with the ASME over the years to eliminate accidents due to design and construction. Such action would play a tremendous role in achieving further reduction of pressure vessel accidents.

A.S.S.E. on the National Scene

LAUNCH MEMBERSHIP CAMPAIGN

The National Membership Campaign is on! Chapters, meeting for the first time last month, are making plans for an all-out drive to culminate during the November 15-December 31 campaign period.

Details of the membership drive have been sent to all chapters. As an incentive to chapters, a contest is being held. Awards will be made to the chapter in each region which shows the greatest percentage increase in membership during the contest period.

All applications received at national headquarters during this period and approved by the Membership Committee will be counted. The percentage will be computed by comparing the chapter membership at the beginning and end of the contest period.

Another incentive to chapters is the $2.00 rebate for each new member voted by the Executive Committee during its May meeting. This rebate will be given to chapters beginning November 15 and extending for one year.

A new membership brochure is now available from national headquarters. Chapters have been mailed sample copies and order forms. Please let us know how many you require and also if you want imprinted copies. Imprinting will cost $3.50 per hundred. Please send us the *exact* wording of the imprint and keep within five lines.

● The Special Committee on Junior Achievement meets to discuss awards and honors for Junior Achievers and to study standards to be used as a guide for A.S.S.E. Junior Achievement activities throughout the country. National Committee members include, from left to right, (seated) Gerald Van Steenburgh, Chairman Charles G. Albrecht and Edward N. Deck; (standing) Carleton R. Reid, Arthur G. Lazarus and Otto J. Nowak. (Committee member Edward V. McKeon is not shown.)

Have You Cast Your Ballot For New Society Officers?

(Deadline for receipt of ballots to National Headquarters is October 11.)

Election of officers for the 1961-1962 business year, and three members-at-large. The officers so elected will also be deemed to be the officers of the proposed Illinois Corporation as and when it is officially incorporated.

FOR PRESIDENT
JOHN V. GRIMALDI, *Consultant, Safety and Plant Protection*, General Electric Company, New York, N. Y.

FOR FIRST VICE PRESIDENT
MICHAEL F. BIANCARDI, *Manager of Safety Services*, Allis-Chalmers Manufacturing Company, Milwaukee, Wis.

FOR SECOND VICE PRESIDENT
EDWIN B. LOCKE, *Manager, Engineering Department*, Texas Employers' Insurance Association, Dallas, Texas.

FOR SECRETARY
ALFRED C. BLACKMAN, *Managing Director*, American Society of Safety Engineers, Chicago, Ill.

FOR TREASURER
FRANK E. LADERER, *Director of Safety*, Nationwide Insurance, Columbus, Ohio.

FOR MEMBERS-AT-LARGE:
THREE TO BE ELECTED
(three year term ending 1964)
HOLLY P. BRADLEY, *Supervisor of Safety*, Service Pipe Line Company, Tulsa, Okla.
LEE B. JOHNSON, *Chief Safety Engineer*, Norair Division, Northrop Corporation, Hawthorne, Calif.
W. EUGENE STUFFING, *Director of Safety*, Carrier Corporation, Syracuse, N. Y.

(This is *not* the Official Ballot. Ballots have been mailed to all members individually. If you have not received yours, write to the National Headquarters immediately.)

Life MEMBERS

ALBERT E. ABDERHALDEN

Albert E. Abderhalden, a member of the Metropolitan Chapter, has been elected to Life Membership in our Society. Mr. Abderhalden, who retired from Royal Globe Insurance Group in 1960, had been active in safety work since joining the company in 1926. He was assistant superintendent of the Metropolitan Loss Prevention and Engineering Department at the time of his retirement.

Mr. Abderhalden joined our Society in 1946.

H. ARCHER ASHTON

H. Archer Ashton has been presented a Life Membership in our Society. Mr. Ashton, a member of the Philadelphia Chapter since 1939, served as its general chairman during 1952-53. He has served on the board of governors, Philadelphia Safety Council, was a charter member of the South Jersey Industrial Safety Council and president of that group in 1945, and is a member of the Veterans of Safety.

Mr. Ashton, associated with Mobil Oil Co. from 1922 until his retirement in 1960, had been active in safety work with the company for 38 years.

CHARLES A. DE MONGE

Charles A. DeMonge was presented with a Life Membership Certificate at the June meeting of the Greater Detroit Chapter. He retired May 31, 1961 after 31 years with Kelsey - Hayes Wheel Co. Mr. DeMonge was safety director with the company at the time of his retirement. He has been active in the Engineering Society of Detroit, Veterans of Safety, Society of Military Engineers, Detroit Industrial Safety Council and the Michigan Industrial Hygiene Society.

C. A. DeMONGE

Mr. DeMonge became a member of our Society in 1940.

● Roger Sheldon, chairman of the Sacramento Valley Chapter, left, presents a Life Membership Certificate to A. Irving Rivett, former head of the State Division of Highways. Mr. Rivett joined our Society in 1944 and is a charter member of the Sacramento Valley Chapter.

HARRY P. GORMAN

Harry P. Gorman recently became a Life Member of our Society. A member of the Philadelphia Chapter since 1939, Mr. Gorman had been active in safety work with E. J. Lavino and Co. from 1929 until his retirement in 1960. He joined the company in 1923.

Mr. Gorman was personnel director with the Norristown, Pa. firm at the time of his retirement.

EDWARD C. HOLDEN JR.

Vice Admiral Edward C. Holden, Jr., U.S.N.R. (Ret.) has been named a Life Member in our Society. He joined the Metropolitan Chapter in 1934 and has been active in various safety organizations including the National Safety Council, Veterans of Safety and the Greater New York Safety Council.

From the time he joined United States Protection and Indemnity Agency, Inc. in 1930 until his retirement in 1961, Vice Admiral Holden was actively engaged in safety work. He became president of the firm in 1955. Vice Admiral Holden attended the Boston University Law School.

HARRY HUNTER

Recently elected to Life Membership in our Society, Harry Hunter has been a member of the Los Angeles Chapter since 1940. A graduate of the University of Chicago from which he holds a degree in Mechanical Engineering, Mr. Hunter has lectured at the University of Southern California on safety-related subjects.

He has been active in safety work for the past 25 years, having owned his own business, served insurance companies and industrial plants and made surveys and engineering reports in matters pertaining to safety and fire prevention.

DAYTON E. HUSK

Recently elected to Life Membership in our Society after 45 years in safety work, Dayton E. Husk retired as safety director of the New Jersey Power and Light Co. in 1959. He had been with the company for 15 years. Prior to that, Mr. Husk was safety engineer with the Metropolitan Edison Co. of Easton, Pa. for 20 years.

Mr. Husk became a member of the Philadelphia Chapter of our Society in 1944.

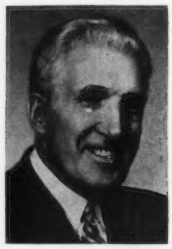
WARREN S. HYDE

A member of the San Francisco Chapter of our Society since 1940, Warren S. Hyde was recently presented with a Life Membership Certificate. He retired from the Pacific Gas and Electric Co. as safety supervisor on June 22, 1961 after a career of 41 years with the company.

For many years Mr. Hyde worked with the California Division of Industrial Safety in the revision of State Safety Orders. For seven years he participated in continuous revision work on uniform safety rules for electric utilities as a member of the Pacific Coast Electric Association. Mr. Hyde is a member of Veterans of Safety, the American Gas Association, Edison Electric Institute and the Pacific Coast Gas Association.

MICHAEL J. MC CARTHY

At the June meeting of the Greater Detroit Chapter, Michael J. McCarthy was presented with his Life Membership Certificate. Mr. McCarthy was with the Fisher Body Division of General Motors Corp. from 1926 until 1953 when he retired as safety director. He joined our Society in 1945.



M. J. McCARTHY

Mr. McCarthy participated in the activities of the National Safety Council as general chairman of the Automotive and Machine Shop Section and the Power Press Section. He served on the Engineering Committee of the President's Conference of Industrial Safety and is a member of the Veterans of Safety.

Regional and Chapter Activities

Philadelphia Chapter Honors Past Chairmen

● First Vice President John V. Grimaldi shown in background with retiring Philadelphia Chapter Chairman Herman L. Whiteman at the Chapter's opening dinner meeting honoring past chairmen at the Philadelphia Engineers Club. Loretta Rissel, Miss Philadelphia, pins carnations on the 17 past chairmen attending the dinner.

● Incoming Philadelphia Chapter Chairman George W. Truman, left, receives the gavel from retiring Chairman Whiteman at the installation of 1961-62 Chapter officers while Dr. Grimaldi, featured speaker at the Chapter's opening dinner meeting, looks on.

Chapter Clips

The **Greater Kansas City** Chapter has announced a project to assist local schools in developing tornado emergency plans. Jack Mattoon has been named chairman of the project committee, with assistance from Harry Rogers and Russell Hames.

* * *

The **Washington** Chapter is working with representatives of American University in the Nation's Capital to determine the possibilities of introducing courses in accident prevention subjects at the Walker Chapel Branch of the University. A committee composed of Earl D. Heath, Seth Jackson, Bernard P. Landry and John P. Watson is in contact with the University.

* * *

Five members of the **Eastern New York** Chapter recently assisted as judges of a Safety Poster contest sponsored by the United Commercial Travelers Co. in Albany. The five are Frank Gillmor, William Cookson, Byron Dewey, Charles Hanlon and Carl Fryer.

* * *

The **Genesee Valley** Chapter has voted a sum of $50.00 to the Rochester (N.Y.) Public Library for expansion of the library's Safety literature. Chapter members are asked to suggest any titles to be added to the shelves. C. E. Peitscher is in charge of the project for the chapter. The **Boston** Chapter has also announced similar action in Boston.

* * *

Art Pool of the **Greater Kansas City** Chapter is heading a finance drive to raise $1,000 to underwrite the chapter's Boy Scout program.

●The South Florida Chapter recently honored J. Edwin Larsen, State Treasurer and Insurance Commissioner, for his leadership in the traffic safety movement. He is chairman of the Florida Citizens Committee for Highway Safety. At the same dinner meeting, new Chapter officers were installed. Seated at the speaker's table are, from left to right, Jeannette Parada; H. T. "Dutch" Shullenberger, master of ceremonies; Mr. Larsen and Jack Thaler, new general chairman of the South Florida Chapter.

● P. W. Logan, Southeast Region vice president, left, at the recent installation of South Carolina Chapter officers for 1961-62, discusses plans for Chapter activities in the coming year with new Chapter President Fred Thackston, Vice Chairman, J. B. Owens, Secretary Ralph C. Genoble, and Treasurer C. B. Simmons. The induction of South Carolina Chapter officers took place at a dinner meeting in the home of Mr. and Mrs. James R. Young. Mrs. Young is one of eight women members of A.S.S.E.

Chapter Clips

The **Boston** Chapter is huddling with Deans of Northeastern University over a proposed grant by the chapter for safety purposes, according to Scholarship and Awards Chairman Robert R. Conroy.

* * *

Speakers from the **North Florida** Chapter's recently organized Speaker's Bureau have talked to four organizations recently. The chapter and the Occupational Division of the Jacksonville-Duval County Safety Council are cooperating on the project.

New Chapter Forming In Colorado Springs

A new chapter, which grew as an extension of the Colorado Chapter, is being formed in the Colorado Springs area.

Under the guidance of Colorado Chapter officers and West Central Region Vice President Robert J. Dougherty, the group, to be known as the "Pike's Peak" Chapter, reports that close to 20 members are prepared to form the nucleus of the new group.

● Pictured at one of the meeting sessions of the Fourth Annual Safety Institute recently is Society Managing Director A. C. Blackman, shown in the center of the first row, who was a featured speaker. The Institute, sponsored by the Arkansas Chapter in cooperation with the University of Arkansas Department of Industrial Engineering and Division of General Extension, was attended by more than 200 supervisors and foremen.

NEW ALL-PURPOSE extinguishers

Now... U.L. and F.M. approved for all classes of fires!

Now you can safely, effectively fight all classes of fire–A, B and C–with a single type of extinguisher! These revolutionary new ALL-PURPOSE Dry Chemical Extinguishers carry *the highest* Underwriters' Laboratories "ABC" ratings . . . are also approved by Factory Mutual. They provide the most powerful three-in-one fire protection ever offered in a single extinguisher! The 30 lb. model (U.L. rating 4-A, 20-B, C) packs fire-killing power equal to *two* Soda Acid extinguishers (rated 2-A) plus *one* conventional Dry Chemical extinguisher (rated 20-B, C)!

All-Purpose ABC rated extinguishers expel a new patented "Formula S" powder* which reacts chemically upon contact with all classes of fire. Powder is transformed into a strong fire-retardant coating that virtually eliminates re-flash in deep-seated wood and other Class A fires, including rubber! Free-flowing, non-toxic, non-abrasive "Formula S" is equally effective on burning liquids (Class B) and electrical fires (Class C).

Three-In-One Fire Protection

Smothers Class A fires with an insulating cover . . . prevents re-ignition or flashback!
Smothers and cools Class B flammable liquid fires!
OIL
Smothers Class C electrical fires . . . will not conduct electricity!

Available in 20 and 30 lb. sizes, featuring easy squeeze-grip operation . . . no annual recharge. Order today from your distributor! Look in the Yellow Pages under "Fire Protection Equipment." Or write to The Fyr-Fyter Company, Dayton 1, Ohio.

Fyr-Fyter

*Monoammoniumphosphate treated with a silicon resin.

Branches: Atlanta, Baltimore, Boston, Chicago, Dallas, Dayton, Detroit, Los Angeles, New York, Newark, Philadelphia, Pittsburgh, Portland, Rochester, San Francisco, Toronto (Ontario). Representatives and Distributors in all principal cities.

SEE THESE EXTINGUISHERS AT BOOTHS 146-149 NATIONAL SAFETY CONGRESS

of the Society and the Office of Civil and Defense Mobilization. Arthur H. Christian, corporate safety engineer, American Viscose Corp., Philadelphia, will preside over both sessions.

Wednesday morning's meeting will include talks on "The National Program for Industry Defense," by Virgil L. Couch, director, Industry Office, OCDM, Battle Creek, Mich.; "How One Company Has Prepared for Industry Defense" by Richard L. Wheland, industrial defense director, Jones and Laughlin Steel Corp., Pittsburgh; and "Industrial Mutual Aid Associations for Emergencies" by Norman D. Ferrari, security officer, Weirton Steel Co., Weirton, W. Va.

The Thursday morning sessions on "Industry Mobilization and Emergency Planning" will have talks on "Training the Plant Defense Corps" by John E. Twomey, superintendent, Industrial Defense Planning, Western Electric Co., New York City;

ROBERT H. ALBISSER
Multi-Plant Operations

"Protection of Vital Industrial Records and Documents" by Frank J. Keeler, vice president, Chase Manhattan Bank, New York City, and "Informing and Educating Employes in Civil Defense" by J. W. Lawton, civil defense coordinator, Illinois Bell Telephone Co., Chicago.

In addition to the three part series on "New Concepts and Trends in Safety" and the two part series on "Industry Mobilization and Emergency Planning" three other sessions are planned for Tuesday, October 17, five are scheduled for Wednesday, October 18 and three for Thursday, October 19.

Tuesday meetings will include "Review of Significant Accident Case Histories" presided over by Harry W. Rapp, Jr., supervising chemical engineer, The Travelers, Hartford, Conn.

The session to be held in the Florentine Room of the Pick-Congress Hotel will feature talks on "Mechanical Accidents" by Robert P. Burrows, safety director, Underwood Corp., Hartford, Conn.; "Electrical Accidents" by Herbert J. Metzger, safety director, Orange and Rockland Utilities, Inc., Nyack, N.Y.; and "Chemical Accidents" by John F. Moriarty, safety director, Shawinigan Resins, Springfield, Mass.

MULTI-PLANT OPERATIONS

"Safety in Multi-Plant Operations" is the subject of a Tuesday morning session being held in Private Dining Room 2 of the Conrad Hilton. Presiding will be Lewis R. Morrison, manager of safety, ACF Industries, Inc., New York City. Participants in the "Multi-Plant Safety Administration Workshop" will be Robert H. Albisser, safety manager, Merck and Co., Rahway, N.J.; Frank R. Barnako, manager, Compensation and Safety Dept., Bethlehem Steel Co., Bethlehem, Pa.; John A. O'Donnell, manager of ground safety, American Airlines, Inc., Flushing, N.Y.; and Dmitro A. Patrician, administrator, Radio Corporation of America, Camden, N.J.

The third Tuesday morning session, "The Use of Rules and Discipline in Safety," to be held in the Waldorf Room of the Conrad Hilton, will be presided over by Nixon de Tarnowsky, manager of safety and communications, F. and M. Schaefer Brewing Co., Brooklyn, N.Y.

Speakers will include Joseph E. Nichols, director of safety, Reynolds Metals Co., Richmond, Va., speaking on "Are There Too Many Safety Rules?"; James F. Van Namee, administrator, accident prevention services, Westinghouse Electric Corp., Pittsburgh, talking on "Achieving

JOSEPH E. NICHOLS
Too Many Safety Rules?

and Maintaining Respect for Company Rules"; and Stan Riddle, senior safety engineer, Ford Motor Co., Brook Park, Ohio, who will speak on "Constructive Use of Discipline in Safety Violations."

Wednesday morning sessions will be held at the LaSalle, Pick-Congress and Conrad Hilton Hotels.

"Engineering Aspects of Safety," presided over by Thomas H. Bullard, manager of safety and industrial hygiene, The Budd Co., Philadelphia, will meet in the Century Room of the LaSalle Hotel.

The session will consist of talks on "Establishing a Product Safety Program" by William B. George, product safety engineer, International Business Machines Corp., San Jose, Calif.; "Safe Application of Electrical Control on Machine Tools" by Fred C. Peregoy, supervisor of Safety, Westinghouse Electric Corp., Baltimore, Md.; and "Establishing Safety Standards for In-Plant Contractors" by Robert L. Moore, superintendent of

ROBERT L. MOORE
Establishing Safety Standards

engineers, Lumbermen's Mutual Casualty Co., Chicago.

In the Waldorf Room of the Conrad Hilton, a meeting on "Establishing Objectives and Measuring Safety Performance" will be presided over by J. J. Prabulos, safety manager, National Distillers and Chemical Corp., New York City. This session will highlight the weaknesses and strong points of the Disabling Injury Frequency Rate, the most widely accepted method for measuring safety performance.

Subjects will include "The ASA Disabling Injury Frequency Rate Is a Good Measure of Safety Performance" by Earl R. Wallace, senior safety engineer, Eastman Kodak Co., Rochester, N.Y.; "Due to Weaknesses in the ASA Code, the Disabling Injury Frequency Rate Is Not a Good

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members

IN THE NEWS

BERK SPEAKS IN QUEBEC

Thomas J. Berk, 1960-61 chairman of the A.S.S.E. national Committee on Public Relations, was a featured speaker at the annual general meeting of the Quebec Pulp and Paper Safety Association, Inc. Speaking to the gathering held September 14-15 in Ste. Adele, Quebec, Mr. Berk discussed "Off-The-Job Safety."

THOMAS J. BERK

A member of the Metropolitan Chapter, Mr. Berk is safety consultant with Metropolitan Life Insurance Co.

NAMED TO ATA SAFETY POST

John W. Jacobson, Greater Detroit Chapter, has been named central regional chairman of the American Trucking Association's Council of Safety Supervisors. Mr. Jacobson is director of the accident control division of the F. J. Boutell Driveaway Co. of Flint, Mich.

He joined our Society in 1952.

LOGAN WRITES ARTICLE

P. W. Logan, Southeast Region vice president, authored an article titled "Near Accidents Rob Builders of Earned Profit" in the June 1961 issue of *American Builder.*

P. W. LOGAN

Mr. Logan, who has served six terms as Southeast Region vice president, has written several articles for our Society publications.

He has a BS degree in industrial engineering from Virginia Polytechnic Institute and joined the Society in 1934. He has served as general chairman and national representative for the Georgia Chapter and on many national committees.

HEADS DALLAS FIRE COUNCIL

D. M. Johnson, Southwest Chapter, has been named chairman of the Dallas Fire Council for a two-year period. The Council is an advisory body chosen by the Dallas City Council to promote and sponsor fire prevention, training and inspection programs in schools, hospitals, homes and other institutions.

Mr. Johnson, who has been engaged in safety work with Employers Mutuals of Wausau since joining the company in 1937, became a member of our Society in 1941. He is a graduate of the University of Kansas, from which he holds a B.S. degree in mechanical engineering.

ON NATIONAL PANEL

The American Arbitration Association has named *Hugh M. Wolflin,* a consulting engineer specializing in industrial accident control and a member of the Society's Los Angeles Chapter, to its National Panel of Arbitrators. Wolflin, whose offices are in Whittier, Calif., will be available to serve in disputes over the performance of commercial contracts.

H. M. WOLFLIN

Wolflin received his B.S. in mining engineering from the University of Arizona. He received an M.A. degree in science and engineering from Columbia University.

He has served as head mining engineer for the U.S. Bureau of Mines, and senior engineering in the legal department, Metropolitan Water District of Southern California. A member of our Society in 1949, he is also a member of the American Institute of Mining, Metallurgical and Petroleum Engineers.

OBSERVES 25TH YEAR

James D. Wynne, district service manager with Liberty Mutual Insurance Co., was honored on September 25 with membership in the company's Quarter Century Club, having completed 25 years of service with Liberty.

JAMES D. WYNNE

Mr. Wynne, a member of the Boston Chapter since 1948, has served his Chapter as secretary in 1954-55, treasurer during 1955-56, chairman in 1957-58 and national representative in 1958-59-60. During 1960-61 he was chairman of the national Committee on Safety Standards.

Nuclear Society Meets in Chicago November 6-10

A week-long series of meetings will be sponsored by the American Nuclear Society in the Conrad Hilton Hotel, Chicago, November 6-10.

Thousands of leading national and international scientists and engineers are expected to attend the ANS sessions, which will run concurrently with a meeting of the Atomic Industrial Forum. The program will include 38 sessions covering subjects from reactor facilities and analysis to latest research developments.

A special session of the meeting will deal with "Radioactivity in the Atmosphere." Experts from foreign countries will present papers and discuss the role of research on measurements of radioactivity in the atmosphere in other countries.

In addition, the American Nuclear Society-Atomic Industrial Forum meeting will include the Atomfair Exhibit and the National Youth Conference on the Atom.

Congratulations to

A. S. S. E.

and its members
in this big step forward
for the Journal

May we always be privileged to serve and help you and your members as we have done in the past.

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Technical Literature

BOOK REVIEWS
STANDARDS - CODES
GUIDES - DATA SHEETS
MANUALS - BOOKLETS
FILMS - VISUAL AIDS

Book Reviews

Morale Factors in Industrial Management by George Singer is a new book which examines the factors which go into making up good morale in industry. The author's premise is that industry must consider each factor as a complex rather than as an entity.

Part One of the volume summarizes conclusions of previous studies on the subject and Part Two describes the author's research in a typical factory. Included in the book are various questionnaires used by the writer in his field work, plus a transcript of a sample interview. Available from Exposition Press, Inc., 386 Park Ave., So., New York 16, N.Y., at $6.00 a copy.

Standards—Codes

American Standards on Allowable Concentrations of Benzene, (Z37.4-1960), Xylene, (Z37.10-1960), Toluene, (Z37.12-1960), has recently been published by ASA. The standards include the properties of the solvent, the maximal acceptable concentration, sampling procedure and analytical methods together with references to the literature.

Copies of the three standards are available at $1.00 each from the American Standards Association, 10 E. 40th St., New York 16, N.Y.

* * *

American Standard Safety Code for Laundry Machinery and Operations, (Z8.1-1961), is available from ASA. This standard applies to moving parts of equipment used in laundries and to conditions peculiar to this industry.

Copies of the new safety code may be obtained from the American Standards Association, 10 E. 40th St., New York 16, N.Y.

Guides-Data Sheets

Recommended Safe Practices and Procedures—Storage and Handling of Shock and Impact Sensitive Materials, SG-7, has been prepared by the Manufacturing Chemists' Association. The safety guide pamphlet stresses that many chemical substances, when stimulated by shock or impact, release sudden energy in the form of heat, or heat and gas.

Copies of SG-7 are available from the Manufacturing Chemists' Association, 1825 Connecticut Ave., N.W., Washington 9, D.C.

* * *

Chemical Safety Data Sheet, (SD-82), listing properties and essential information for safe handling and use of Toluidine is now available from the Manufacturing Chemists' Association. The data sheet discusses properties, hazards, engineering control of hazards, employe safety precautions, fire fighting procedures, safe handling and storage practices, tank and equipment cleaning and repairs, waste disposal, medical management and first aid.

This data sheet may be obtained from the Manufacturing Chemists Association, 1825 Connecticut Ave., N.W., Washington 9, D.C.

* * *

Two Safety Data Sheets, (SD-53-A), (SD-53-B), are available through the Manufacturing Chemists Association. SD-53-A details the physical properties and provides minimum engineering design recommendations for bulk storage facilities for hydrogen peroxide solutions not exceeding 52 per cent concentration by weight. SD-53-B outlines recommended practices for packaging, handling, transportation, storage and use of hydrogen peroxide solutions exceeding 52 per cent concentration by weight.

Copies of the two data sheets may be obtained from the Manufacturing Chemists Association, 1825 Connecticut Ave., N.W., Washington 9, D.C. at a cost of 30 cents for Supplement A and 50 cents for Supplement B.

* * *

Stibine, Phosgene, n-Butylamine, Dioxane, recently published Hygienic Guides have been released by the American Industrial Hygiene Association.

Each of the four guides contains the most recent information on potential hazards, safe exposure limits, control methods, and specific medical procedures for treatment of persons overexposed to the substance.

Copies of the guides are available from the American Industrial Hygiene Association, 14125 Prevost, Detroit 27, Mich., at 25 cents each. Remittance must accompany order for $2.00 or less.

* * *

Properties and Essential Information for Safety Handling of Methyl Ethyl Ketone, Chemical Safety Data Sheet, SD-83, is now available from the Manufacturing Chemists' Association. The safety data sheet details the properties, hazards, engineering control of hazards, Employe safety, fire fighting, handling and storage, tank and equipment cleaning and repairs, waste disposal, medical management and first aid.

Copies of SD-83 are available for 30 cents per copy from the Manufacturing Chemists' Assn., 1825 Connecticut Ave., N.W. Washington 9, D.C.

* * *

Recommended Safe Practices and Procedures for Entering Tanks and Other Enclosed Spaces SG-10, is now available from the Manufacturing Chemists' Association. The new safety guide states that hazards inherent in tank entry can be avoided or overcome by establishing a definite system of preplanning for tank entry, preparing the vessel for entry by physically isolating it, cleaning it and testing it, and using a formal permit system requiring written authorization for entry to be issued by the supervisor in charge.

Safety guide SG-10, is available from the Manufacturing Chemists' Association, 1825 Connecticut Ave., N.W., Washington 9, D.C. at 30 cents a copy.

Manuals—Booklets

Supervisor's Safety Manual, Second Edition, a 365-page reference book, is now available from the National Safety Council.

The text is written to show foremen the relationship between safety and efficient production. The new edition is completely revised and updated. It may be obtained at $4.25 per copy from the National Safety Council, 425 N. Michigan Ave., Chicago 11, Ill.

* * *

Two symposium volumes of interest to safety engineers are available from the American Association for the Advancement of Science. They are *"Low-Level Radiation,"* a 158-page edition at $6.50; and *"System of Units,"* a 308-page edition at $6.75.

Copies may be obtained from AAAS Publications, 1515 Massachusetts Ave., N.W., Washington 5, D.C.

* * *

Family Recreation and Safety, a reference guide concerning off-the-job safety of employes has been issued by New York University's Center for Safety Education.

Including a section on organizing the family trip by A.S.S.E. Second Vice President Michael F. Biancardi, the guide covers such subjects as water safety, motor boating, camping, fishing, swimimng and scuba diving.

Copies of the guide are available at $1.00 or 75 cents for 10 or more from the New York University Center for Safety Education, Division of General Education, Washington Square, New York 3, N.Y.

Accident Facts, the 1961 edition, has been published by the National Safety Council. The 96-page reference book contains facts and statistics on every field including occupational, traffic, home, farm, school and others.

Copies are available at $1.85 from the National Safety Council, 425 N. Michigan Ave., Chicago 11, Ill.

* * *

Accident Prevention, a new booklet containing 15 articles on accidents is available for professional use from the Metropolitan Life Insurance Co. The publication contains reprints of the company's statistical articles that appeared in 1959 and 1960. Included are studies of accidental poisonings, drownings and falls, in addition to different aspects of the motor vehicle accident problem.

Copies are available from the Health and Welfare Division, Metropolitan Life Insurance Co., 1 Madison Ave., New York 10, N.Y.

* * *

Air Sampling Instruments, for evaluation of atmospheric contaminants, a new publication by the American Conference of Governmental Industrial Hygienists is now available. The manual contains descriptions and performance data on more than 100 instruments.

Copies may be obtained at $7.50 from the American Conference of Governmental Industrial Hygienists, 1014 Broadway, Cincinnati 2, Ohio.

* * *

Pocket Guide to First Aid, a new wallet-size booklet, has been published by the National Safety Council. Its 24 pages provide instruction on first aid measures for bleeding, shock, poisoning, wounds, burns, fractures, sprains and strains and stoppage of breathing.

The booklet may be obtained from the National Safety Council, 425 N. Michigan Ave., Chicago 11, Ill. Copies are available at seven cents each and a minimum order of 50 copies is required.

* * *

The Playscript Procedure, a 183-page book by Leslie H. Matthies, describes a new method of procedure writing. The book defines good procedures, shows the way to improve them, gives comprehensive action vocabulary to achieve this end.

Copies of the book are available at $5.95 through Office Publications, Inc., 232 Madison Ave., New York 16, N.Y.

* * *

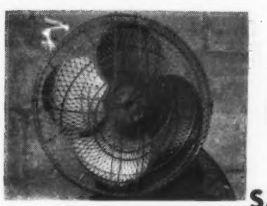
Key to Smoley's, an engineering handbook has been published by George F. Wolters. Booklet is designed to simplify the understanding of various C. K. Smoley's mathematical tables. The 75-page publication shows simplified logrithmic tables and how to master them.

Copies may be obtained from George F. Wolters, P.O. Box 475, Ormond Beach, Fla. at $1.50 each.

Films

That They May Live, a 16mm sound film is available in color or black and white from Pyramid Film Producers. Produced by the University of Saskatchewan College of Medicine, the film demonstrates mouth-to-mouth resuscitation respiration showing how it is best performed. Illustrated among sequences in the film are methods of resuscitation in two-car collisions, industrial accidents, drowning and infant revival after plastic bag suffocation.

Color prints may be purchased at $185.00 or $250.00 with group training sequence; black and white prints are available at $110.00 or $125.00. The film may be rented at $10.00 from Pyramid Film Producers, P.O. Box 1048, Santa Monica, Calif.



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Measure of Safety Performance" by Gordon L. Bowen, safety and workmen's compensation administrator, American Radiator and Standard Sanitary Corp., New York City; and "New Concepts in Measuring Safety Performance" by Dr. John V. Grimaldi, consultant, safety and plant protection, General Electric Corp., New York City.

The other three Wednesday morning sessions will be held in the Pick-Congress Hotel.

In the Gold Room a meeting co-sponsored by the American Material Handling Society and A.S.S.E. will discuss "Safe Material Handling." This session will be presided over by William N. Cox, Jr., professor of industrial and safety engineering, Georgia Institute of Technology, Atlanta.

DYNAMIC APPROACH

Speaking on "A Dynamic Approach to the Sore Back" will be Dr. Charles F. Martin, plant physician, I.B.M. Corp., Lexington, Ky. Charles W. Boggs, safety director with the same company will talk on "Safety's Role in Preventing Back Injuries." Discussing "Human Engineering and Material Handling Safety" will be Dr. Willem S. Frederik, director, research laboratory, Liberty Mutual Insurance Co., Hopkinton, Mass.

Co-sponsored by the Chemical Section of the National Safety Council and A.S.S.E., a session on "Safe Handling of Low Level Radioisotopes" will meet in the Florentine Room. Howard H. Fawcett, consulting engineering, General Electric Co., Schenectady, N.Y., will preside at the meeting with E. R. Harris of the same company as speaker. The program will include an actual experiment using radioisotopes in tracer amounts to show that radiation can be controlled if proper knowledge and precautions are built into the experiment.

The third Wednesday morning session in the Pick Congress will be held in the Great Hall. Presided over by George W. Nickels, manager of safety, Armstrong Cork Co., Lancaster, Pa., this meeting will consider "The Dynamics of Safety Through Supervision."

Speakers at this session will be John A. Turk, director of safety and industrial health, U.S. Metals Refining Co., Carteret, N.J., talking on "Modern Techniques for Utilizing Executive Management Participation"; Richard R. Wiley, safety engineer, Bethlehem Steel Corp., Bethlehem, Pa., speaking on "Safety Rule Enforcement—A Key to Effective Injury Prevention"; and Frank E. Bird, Jr., supervisor of safety and plant protection, Lukens Steel Co., Coatsville, Pa., discussing "Damage Control—A New Horizon in Accident Prevention."

SAFETY EDUCATION

On Thursday, October 19, the final day of the National Safety Congress, the Society has planned a session on "Safety Education for Safety Personnel" to be held in the Upper Tower Room of the Conrad Hilton. Frank E. Laderer, Society treasurer and director of safety for Nationwide Insurance in Columbus, Ohio, will preside.

Speakers will be George W. Harper, professor, School of Mechanical Engineering, University of Illinois, talking on "What Do We Expect of the Safety Engineer?"; Thomas H. Rockwell, professor, Industrial Engineering Dept., Ohio State University, speaking on "What Knowledge Does the Safety Engineer Need?" and D. A. Weaver, professor, Public Safety Institute, Purdue University, speaking on "How Do We Prepare the Safety Engineer and Upgrade Performance Levels?"

GEORGE W. HARPER
What Do We Expect of Safety Engineer?

THOMAS H. ROCKWELL
What Knowledge Is Needed?

"The Kintz and Browne Fire and Static Electricity Demonstration" will be held in the Waldorf Room of the Conrad Hilton, with Roy G. Benson, manager of the Industrial Dept., National Safety Council presiding.

Demonstrating "Static Electricity Usual and Unusual" will be G. M. Kintz, supervisor of health and safety and H. F. Browne, supervisory safety engineer, with District G., Bureau of Mines, U.S. Dept. of the Interior, Dallas, Texas.

The final Society-sponsored Thursday session will be in the Florentine Room of the Pick-Congress Hotel.

SAMUEL MCKAY JR.
Traffic Safety Problems

Presided over by Samuel McKay, Jr., supervisor of safety, The Bell Telephone Co. of Pennsylvania, Philadelphia, this meeting will deal with "Traffic Safety Problems."

Speakers at the session will be William F. Sabota, safety advisor, Humble Oil and Refining Co., Linden, N.J., who will speak on "Better Driving for the Whole Family" and Franklin M. Kreml, director of the Transportation Center, Northwestern University, Evanston, Ill., talking on "Getting People to Understand Law Enforcement."

Calendar

1961

HOUSTON, TEXAS—American Standards Association 12th National Conference on Standards. Information and registration blanks from American Standards Association, 10 E. 40th St., New York 16, N.Y. ■ **October 10-12**

CHICAGO, ILLINOIS—American Society of Safety Engineers Annual Meeting. Conrad Hilton Hotel, Chicago, Ill. ■ **October 16**

CHICAGO, ILLINOIS—49th Annual National Safety Congress and Exposition. Conrad Hilton, Sheraton-Blackstone, Pick-Congress, Hamilton, LaSalle, Palmer House and Sheraton Chicago Hotels. Information from National Safety Council, 425 N. Michigan Ave., Chicago 11, Ill. ■ **October 16-20**

NEW YORK CITY—American Society of Civil Engineers Annual Convention. Hotel Statler Hilton. Information from American Society of Civil Engineers, 33 W. 39th St., New York 18, N.Y. ■ **October 16-20**

CHICAGO, ILLINOIS — American Nuclear Society General Meeting concurrent with Atomic Industrial Forum, Atomfair and National Youth Conference. Conrad Hilton Hotel. Information from John L. Kuranz, Vice President, Nuclear-Chicago Corp., 333 E. Howard St., DesPlaines, Ill. ■ **November 6-10**

DETROIT, MICHIGAN—American Public Health Association 89th Annual Meeting. Information from American Public Health Association, 1790 Broadway, New York, N.Y. ■ **November 13-17**

NEW YORK CITY—Manufacturing Chemists' Association 11th Semi-Annual Meeting and Midyear Conference. Information from Manufacturing Chemists' Association, Inc., 1825 Connecticut Ave., N.W., Washington 9, D.C. ■ **November 21**

1962

DALLAS, TEXAS—23rd Annual Texas Safety Conference and Governor's Highway Safety Conference sponsored by Texas Safety Association. Adolphus Hotel. Information from Texas Safety Association, 830 Littlefield Building, Austin, Texas. ■ **March 25-28**

PITTSBURGH, PENNSYLVANIA—37th Annual Western Pennsylvania Safety Engineering Conference and Exhibit. Jointly sponsored by Western Pennsylvania Safety Council and Western Pennsylvania Chapter, A.S.S.E. Pittsburgh Hilton Hotel. Information from Harry H. Brainerd, Executive Manager, Western Pennsylvania Safety Council, 305 First Federal Building, 600 Grant St., Pittsburgh 19, Pa. ■ **March 27-29**

BOSTON, MASSACHUSETTS—41st Annual Massachusetts Safety Conference and Exhibit. Sponsored by Massachusetts Safety Council, Safety Council of Western Massachusetts and Worcester County Safety Council. Hotel Statler Hilton. For Exhibit information write Bert Harmon, Manager, Massachusetts Safety Council, 54 Devonshire St., Boston 9, Mass. ■ **April 2-3**

CHICAGO, ILLINOIS—American Industrial Health Conference. Sponsored by Industrial Medical Association, American Association of Industrial Nurses and American Association of Industrial Dentists. Pick-Congress Hotel. Information from Industrial Medical Association, 55 E. Washington, Chicago 2, Ill. ■ **April 10-12**

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Personnel Center

(Job openings in safety engineering or in related fields are listed in this column at no charge. Employers may use their address or a Section number if so desired. We will assign the number and forward all applications received. Society members seeking positions may submit "Situation Wanted" notices for publication in this column. Members may use either their address or a Section number. Maximum words for either listing is 75. Copy for listings should be sent to THE JOURNAL, American Society of Safety Engineers, 5 N. Wabash Ave., Room 1705, Chicago 2, Illinois.)

JOB OPPORTUNITIES

A large insurance company is seeking three regional engineers with minimum of six to eight years in compensation, liability and elevator insurance. Applicants must be experienced in training new men, setting up programs, and other supervisory capacities. One will service the Chicago area at present but position will grow into supervision of others in Midwest area. A second is for the Los Angeles area and the third is wanted for the Atlanta, Ga. area. No degrees required. Salary commensurate with training and experience. Write *Section 101, Journal of the American Society of Safety Engineers, 5 N. Wabash Ave., Room 1705, Chicago 2, Ill.*

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Safety inspector required to replace man called into service. The opening is shift work with night bonus. The plant is a metal stamping and fabrication plant with approximately 2,000 employees. Applicant should know power press and welding equipment and operations. Work involves all phases of industrial accident prevention and provides a real challenge to anyone interested in safety work. Candidates should contact Mr. Louis Neuman, The Budd Company, 700 Chase Street, Gary, Indiana.

The Wage and Hour and Public Contracts Divisions of the U. S. Department of Labor administers the Walsh-Healey Public Contracts Act. The Chief Safety Engineer's office has openings, at grade level GS-13, with starting salary of $10,635 per annum. These openings are in San Francisco, Dallas, Kansas City (Mo.), Nashville and Washington, D. C. Please forward a Form 57, Application for Federal Employment, which may be obtained at any Post Office, to Mr. E. L. Newman, Chief Safety Engineer, Wage and Hour and Public Contracts Divisions, U. S. Department of Labor, Washington, 25, D. C.

Safety Engineer—with chemistry or chemical engineering degree, minimum five years experience. Midwest company, west of Chicago. Position requires person with considerable initiative and technical versatility. Limited travel 3 to 5 weeks per year. Send resume and salary requirements to *Section 103, Journal of the American Society of Safety Engineers, 5 N. Wabash Ave., Room 1705, Chicago 2, Ill.*

SITUATIONS WANTED

Fire-Safety Director—Twenty years experience with New York City Fire Department; ten years of actual fire duty and ten years as an inspector of hazardous materials. Practical knowledge with sprinklers and standpipe systems, good housekeeping conditions, extinguisher instruction and maintenance, structural stability, fire control, fire prevention, accident reduction, safety and security supervision. Presently attending Queens College majoring in fire administration. A.S.S.E. member, married, home in Franklin Square. Seeking position on Long Island. Write *Sebastiano Lima, 1003 Second Avenue, Franklin Square, L.I., New York.*

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James A. Pounds
John R. Reider
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Obituaries

HOWARD G. BOURNE, safety representative with American Optical Company in Dallas, Texas died August 29. He was 53. A member of the Southwest Chapter since 1940, Mr. Bourne had served as chapter secretary in 1954-55, general chairman in 1956-57 and representative in 1957-58. He was active in safety work with American Optical since joining the company in 1933. ■

PALMER E. BUNKER, Lansing Chapter, died recently at the age of 57. Mr. Bunker, who had been safety engineer and manager with Auto Owners Insurance Co. for 15 years at the time of his death, joined our Society in 1947. He served as his Chapter's representative from 1954 until 1956.

From 1931 to 1943 Mr. Bunker had been connected with plant safety with Lansing dairy companies. ■

JOSEPH CHRISTY, SR., safety inspector with State Insurance Fund died recently. He had been with the organization since 1940. Between 1923 and 1938 Mr. Christy was associated with Cameo Corp. and the Ford Motor Co. as safety inspector.

A member of the Metropolitan Chapter since 1949, Mr. Christy was 63. ■

PETER P. MATHIESON, Eastern New York Chapter, died recently at the age of 60. Mr. Mathieson was safety specialist with the General Electric Company, Schenectady, N.Y. He had been with the company since 1926.

Mr. Mathieson joined our Society in 1950 and served as chapter secretary-treasurer in 1956-57. ■

HARRY G. PRUETT, Chattanooga Area Chapter died August 12. He was 72. At the time of his retirement in 1956, Mr. Pruett was safety director of the Electric Power Board of Chattanooga, a position he had occupied since 1939. He first joined the electric power company which, through changes of ownership, ultimately became part of the Electric Power Board of Chattanooga, in 1913.

Mr. Pruett became a member of our Society in 1954. ■

CLYDE H. RUBLE, Western Pennsylvania Chapter, a member of our Society since 1935 died recently. He was 67. His retirement from West Penn Power Co. in 1958 ended a career of 45 years with the company. He had been in safety work with the company for more than 30 years.

Mr. Ruble was elected to Life Membership in 1959. ■

AL SKLAR, died recently at the age of 57. He was vice president of the Pine Hills Taxis, Inc. and had acted as safety director of the company since joining it in 1947.

Mr. Sklar was a member of the Eastern New York Chapter and joined our Society in 1958. ■

LESTER L. SPENCER, Metropolitan Chapter, died recently at the age of 78. Mr. Spencer, a Life Member, was one of the pioneer founders of our Society. His membership can be traced back to 1919 during the period when the Society underwent its first major reorganization. From 1914 until he retired in 1945, Mr. Spencer was associated with Travelers Insurance Company where he was supervising engineer of engineering and loss control at the time of his retirement.

He served as Metropolitan Chapter Chairman in 1929-30 and was Chapter treasurer in 1931. ■

2 MILLION CARS HAVE SEAT BELTS, REPORTS AUTO INDUSTRIES GROUP

WASHINGTON, D.C.—More than two million automobiles using our streets and highways are now equipped with seat belts for passenger safety, it has been estimated by the Auto Industries Highway Safety Committee.

The estimate was based on results of the first nationwide poll of seat belt installation and use, recently conducted by the committee.

In revealing results of the poll, M. R. Darlington, Jr., committee managing director, stated: "The fact that 3.3% of our automobiles are equipped with seat belts is surprisingly high in view of the relatively recent public acceptance of their use. It is also particularly encouraging to note that more than one-third of the seat belt users contacted in the poll use them at all times to protect their families and friends," he said.

"Substantial increases in seat belt sales, as well as public knowledge that all 1962 model cars will be equipped with seat belt anchorages, should bring about a decided change in future polls," Darlington said. "Public officials and organizations urging the installation and use of seat belts are confident a noticeable improvement will also be reflected in traffic accident statistics," he added.

The nationwide poll of seat belt use was conducted during May and June in 47 states and the District of Columbia in connection with the National Vehicle Safety-Check program. More than 60% of participating communities and NADA dealer members reported results of their surveys. A similar poll is planned for 1962 and subsequent years to provide continuous information.

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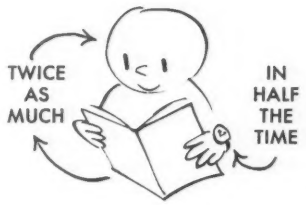

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ON-THE-JOB

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WATER

"The ABC's of WATER SAFETY" — the important safety points for those who boat or swim. Need for water safety education becoming more important every day.

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"OOW and YOU" covers major accident "House Traps." How to avoid the home accidents that kill and injure thousands every year.

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Abstracts

ACCIDENTS AND SAFETY IN BRIDGE CONSTRUCTION. Smith, H. Shirley. *Engineer,* London, United Kingdom, March 3, 1961, Vol. 211, No. 5484, p. 333.

Particular reference is made to accidents on projects in various parts of the world during the last 20 years, which resulted from error in contractor's design calculations, failure of materials, and/or those to bridge foundations generally through cylinders plunging or tilting. Main precautions suggested are thorough checking of erection calculations, provision of erection memorandum, and regular comprehensive inspection on site. From paper before Institution of Civil Engineers, February 14, 1961.

* * *

CONTROL OF FUME FROM ELECTRIC STEEL MELTING FURNACES, Pring, R. T. *Air Conditioning, Heating and Ventilating,* New York, N.Y., January, February, 1961, Vol. 58, No. 1, 2, January, pp. 45-50, February, pp. 121-5.

Nature of contaminants, health aspects, air pollution codes and methods for furnace ventilation using special hoods and gas cleaners are examined relative to control of both indoor and outdoor air pollution caused by furnace discharge. Investigation of systems for direct shell evacuation and methods for computing required ventilation rates for various fume control arrangements.

* * *

COURT CASES OF ALLEGED OCCUPATIONAL DERMATITIS. Schwartz, L. *Industrial Medicine and Surgery,* Miami, Fla., November 1960, Vol. 29, No. 11, pp. 540-544.

To find the truth in every occupational dermatitis case appearing before compensation boards or courts is difficult, if not impossible, but the system at present applied in the USA in which lay judges and juries and referees who know little about medicine and dermatology must decide such cases, is not the best. The author suggests that compensation boards should have the merits of a medical case assessed by a panel of disinterested medical experts hired and paid by the boards.

* * *

CRITERI GENERALI DI VALUTAZIONE DELLA PREICOLOSITA DEGLI INCIDENTI DA TENSIONI DI CONTATTO NEGLI IMPIANTI ELETTRICI A CORRENTE ALTERNATA DI FREQUENZA INDUSTRIALE, E LORO APPLICAZIONI AD ALCUNI CASI PRATICI. Jankowski, A. *Energia Electrica,* Milan, Italy, July, 1960, Vol. 37, No. 7, pp. 633-41.

General criteria for evaluation of danger of contact accidents in industrial A-C power plants and their practical application. Analysis of effects of A-C shocks of varying duration; safety of switchgear and fuses; problem of neutral grounding. 33 references.

* * *

DIAGNOSIS AND COMPENSATION OF RADIATION INJURY—STATEMENT ON THE DIAGNOSIS AND COMPENSATION OF HARMFUL EFFECTS AS A RESULT OF WORK INVOLVING EXPOSURE TO IONIZING RADIATION. *Journal of Occupational Medicine,* Chicago, Ill., October 1960, Vol. 2, No. 10, pp. 503-507.

The Radiation Committee of the Industrial Medical Association (USA), in collaboration with the Workmen's Compensation Committee, has prepared this statement outlining the basic guides for the diagnosis and compensation of injuries resulting from occupational radiation exposure. The statement lists all the general and specific factors currently used in establishing a diagnosis. The hope is expressed that other medical groups will help in producing criteria for diagnosis and compensation.

* * *

EARLY IDENTIFICATION OF PROBLEM DRINKERS IN INDUSTRY. Maxwell, M. A. *Quarterly Journal of Studies on Alcohol,* New Haven, Conn., December 1960, Vol. 21, No. 4, pp. 655-678. Bibl.

A study designed to add to the growing body of systematic knowledge about problem drinkers in industry. The particular focus was on the early signs of alcoholism which appear on the job. But to appraise the utility of specific signs for early identification of the alcoholic, these have to be considered in relation to behaviour both inside and outside the plant. Accordingly, selected data were sought to provide this perspective.

* * *

EFFECT OF ENVIRONMENTAL TEMPERATURE AND HUMIDITY ON LEAD POISONING IN ANIMALS. Baetjer, A. M., Joardar, S. N. D., and McQuary, W. A. *Archives of Environmental Health,* Chicago, Ill., December 1960, Vol. 1, No. 6, pp. 463-477. Illus. Bibl.

In order to determine whether environmental temperature affects susceptibility to lead poisoning, a series of experiments on laboratory animals was started. In the first part of these investigations the environmental temperature conditions which affect lead poisoning were determined. The second part of the experiments dealt with the physiological mechanisms responsible for the effects of high temperature found in the early experiments.

* * *

ENGINEERING FOR SAFETY IN OUTSIDE PLANT. Alford, E. L. *Bell Laboratories Record,* New York, N.Y., January, 1961, Vol. 39, No. 1, pp. 10-13.

Safety considerations for telephone linemen's functional tools, line and equipment hazard-testing equipment, and devices for guarding work areas; quality controls and specifications to insure proper functioning of tools and equipment; recent progress in designing for safety.

* * *

FACTOR OF SAFETY BASED ON PROBABILITY. Svensson, N. L. *Engineering,* London, United Kingdom, January 27, 1961, Vol. 191, No. 4945, pp. 154-5.

Relationship between load, strength, factor of safety and probability of failure; from these relationships and desirable probability of failure it is possible to determine factor of safety to be used in design; it is shown that factor required depends on chosen probability of failure for component; effect of variations in material properties on factor are also considered; language used suggests structural or machine design but most of remarks apply also to more general systems.

* * *

FIGHTING FIRES IN MINES (Zdolávání dulních pozáru). Hofbauer, I. *Státní Nakladatelství Technické Literatury,* Prague, Czechoslovakia, 1960. 199 pp. Illus. Bibl.

A book on underground fire-fighting. The author deals with the origins and causes of these fires and with ways and means of fighting them. The efficient organization of fire-fighting and rescue services for mines is also discussed.

GENERAL RULES FOR THE STRENGTH AND SAFETY OF TOWER CRANES DESIGNED FOR QUICK ERECTION. (Règles générales relatives à la résistance et à la sécurité des grues à tour démontables). Norme francaise NF E 52-082, *French Standards Association* (Association francaise de normalisation), Paris. Approved 30 November 1960. November 1960. 7 pp.

Safety rules and requirements for the design, equipment and layout of tower cranes. The following are dealt with: anchoring devices, outriggers, stop-blocks, etc.; electrical equipment; layout of the cab and means of access (vertical ladders and cages); guarding of moving parts; design of the lifting equipment (hooks, ropes, drums and pulleys). Signs indicating the safe working load at various radii, an audible warning system, load-limiting and travel-limiting devices, springloaded buffer stops, and other safety devices are also provided for.

* * *

1961 YEAR-BOOK OF OCCUPATIONAL SAFETY. (Rocenka ochrany a bezpecnosti práce 1961). *Práca,* Bratislava, Czechoslovakia, 1960. 215 pp. Illus. Price: 7.10 Kcs.

This year-book gives a brief description of the main principles of occupational safety in electrical engineering, agriculture and the timber industry, and deals with ventilation principles, protection against harmful substances in industry, fire protection, regulations on pressure vessels, road and factory transport, and educational aids to safety.

* * *

NOISE AND NOISE CONTROL (Melu ja meluntorjunta). Täydennyskoulutus julkaisu N: o 23, Suomen Teknillinen Seura (STS), Helsinki, Finland, 1960. 213 pp. Illus. Bibl. Price: 2200 F mk.

A collection of twenty lectures forming a course on noise and noise control. Of particular industrial interest are a general paper on the subject, and studies of vibration suppression, noise from ventilation systems, noise from power plants and heavy machinery, and noise and vibration in paper manufacture.

* * *

PRINCIPLES OF THE PREVENTION OF FIREDAMP AND OTHER EXPLOSIONS (Die Grundlagen des Schlagwetter- und Explosionsschutzes). Wantke, J. *ELIN-Zeitschrift,* Vienna, Austria, December 1960, Vol. 12, No. 3/4, pp. 162-189.

The article deals with the physical and chemical mechanisms of explosions, chemical reactions, combustion theories, ignition, explosive limits, flame temperatures, explosion pressure and explosion propagation. The hope is expressed that the formulation of a general theory of explosions may help to reconcile the many conflicting measurements and research results reported up to the present. Such a theory would provide engineers with a basis for fruitful work in the field of explosion prevention.

* * *

RESEARCH WITH RESPECT TO FATAL ACCIDENT CAUSES—IMPLICATIONS FOR VEHICLE DESIGN. Haddon, W. *Society of Automotive Engineers—Paper,* 366A New York, N.Y., June 5-9, 1961, 31 pp.

Problem of annual toll of death and injury which results from nation's use of motor vehicles is considered from viewpoint of medical profession concerned with public health. Four possible strategies which might lead to reduction of injury and death, modification of vehicle use, legal and engineering measures, prevention of injuries, and provision of emergency and long range care; examples of design modifications which might be made in direction of reducing injury.

* * *

RIGGING CARGO GEAR—AN INSTRUCTION HANDBOOK FOR STEVEDORES. U.S. Department of Labor, Bureau of Labor Standards, Washington, D.C., reprinted 1960. 26 pp. Illus. Gratis.

Sets forth information regarding stresses to which cargo gear is subjected, rules for rigging gear to keep stresses at a minimum, and practices and conditions which are likely to result in failures. Particularly treats the swinging boom, burtoned loads, stress on guys, jack-knifing, and preventers, and includes a summary of suggested safe practices. Schematic drawings are appended concerned with various stresses, tensions, boom angles, fall angles and the position of guys.

* * *

TOXICOLOGY OF PAINTS (Toxicologie van verfwaren). Zielhuis, R. L. *Mens en Onderneming,* Leyden, Netherlands, November 1960, Vol. 14, No. 6, pp. 322-331. Bibl.

Starting from a classification of paints and varnishes based on the end products and not, as formerly, on the different constituents, the author gives a survey of the typical risks encountered during the application of each kind of paint.

* * *

TECHNICAL PROTECTION MEASURES AGAINST HEAT RADIATION. Bordes, H. J., Erhardt, J. T. G., Eckhardt, W., Schermerhorn, W., and van der Velden, W. *Industrial Medicine and Surgery,* Miami, Fla., November 1960, Vol. 29, No. 11, pp. 526-529. Illus.

A study of protection against heat radiation by screening the hot surface itself with (1) polished metals and (2) nonmetals, paints, dusty metals and corroded metals. The authors conclude that every hot surface can be screened by a suitable screening construction, and that calculations can be relied upon when the temperature of the hot surface is known.

* * *

SOME UNUSUAL ALLERGIC REACTIONS IN INDUSTRY. Key, M. M. *Archives of Dermatology,* Chicago, Ill., January 1961, Vol. 83, No. 1, pp. 3-6. Bibl.

Allergic reactions in industry can take many forms. The most common form is allergic contact dermatitis, which accounts for about 20% of contact dermatitis in industry. Less common is occupational asthma, which may be associated with contact dermatitis. Examples of asthma-dermatitis exposures are metal dusts and compounds, castor bean pomace, toluene diisocyanate, spices, flour and wood dust. Occupational urticaria is rare, but has been caused by inhalation of aliphatic polyamines, castor bean pomace, sulphur dioxide, ammonia, and formaldehyde.

* * *

SUGGESTED IMPROVEMENTS FOR OCCUPATIONAL SAFETY: IV (O zlepsovacie návrhy bezpecnosti práce IV). Neumann, J. *Práca,* Bratislava, Czechoslovakia, 1960. 86 pp. Illus. Bibl. Price: 4.40 Kcs.

Brief descriptions of about 120 new systems and devices from various countries. The suggested improvements relate to the working environment, the safeguarding of machinery, personal protective equipment and electrical installations. They are illustrated by diagrams and photographs.

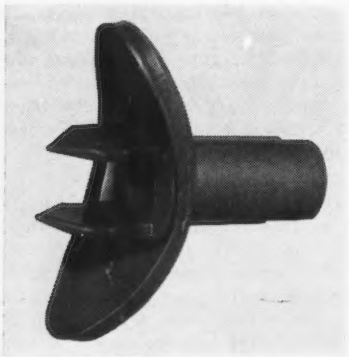
* * *

TIPS FOR TURNAROUND VENTILATION. Raymond, L. W.; Church, F. W.; Venable, F. S.; Yoder, J. D. *Petroleum Refiner,* Houston, Texas, March, 1961, Vol. 40, No. 3, pp. 217-20.

Means of avoiding serious health problems when working inside process equipment in presence of toxic materials; recommendations to use exhaust air-flow techniques, seal exhausters to avoid "short-circuiting" by mounting them on plywood blanks shaped to fit manhole, avoid placing ventilators on openings needed for access or materials handling.

New Products

NEW MSCO RESCUE BREATHER



■ A new compact, lightweight adjunct for mouth-to-mouth resuscitation, called the MSco Rescue Breather, has been announced by the **Medical Supply Company, Rockford, Ill.**

Small enough to be carried in the rescuer's pocket, purse, auto compartment, or first aid kit, the MSco Rescue Breather features a flexible, tightly fitting facepiece that fits all faces and configurations, child or adult.

This new adjunct is simple to use and can be operated with complete safety in the hands of a layman, because it extends only one inch into the victim's mouth and cannot stimulate the gag reflex.

Complete information available through MSco distributors or by writing **Medical Supply Company, Rockford, Ill.**

DIFFUSION-HEAD TYPE ALARM

■ **Johnson-Williams, Inc.** have announced a new addition to their line of combustible gas detectors and alarms. It is the Model RH diffusion-head type alarm for the continuous monitoring of hazardous locations for the presence of natural gas, LPG, and other combustible gases and vapors. The Model RH, priced under $500.00, is considerably lower in cost than permanently installed sample-drawing instruments.

The analyzer unit is housed in a dust-proof aluminum case designed for flush or surface mounting and should be located in a gas-free area. Indicating meter, lamps and operating controls are displayed through the glass window in the hinged door.

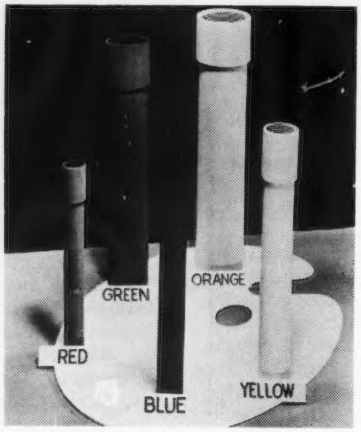
For complete information write to **Johnson-Williams, Inc., Palo Alto, Calif.**

SPRAY-BOTTLE SOLUTION

■ **Onox,** the skin-toughening solution for the treatment and prevention of athlete's foot, is now available in six-ounce spray bottles for those who prefer individual protection. In active cases of athlete's foot, industrial nurses will be able to dispense the squeeze bottles to workers, and to office personnel, too, for uninterrupted daily application both in plant and at home.

Packaged one dozen to the case; shipped prepaid, $15.00. Quantity discounts and free brochure with medical opinions are available. **Onox, Inc., Dept. 7-E, 121 Second St., San Francisco 5, Calif.**

"COLOR-CODED" CONDUITS



■ "Color-coded" Sherarduct Conduit, with MVC-1 coating, has been introduced by **National Electric Division, H. K. Porter Company, Inc.**

This is a rigid steel conduit, available in all sizes in a choice of five colors, with matching elbows and couplings. Special colors may also be obtained.

The new product was developed to provide economical color-coding of conduit runs in factories and other industrial locations, such as in distinguishing runs carrying electrical lines from those carrying telephone or intercom lines. It also is useful where it is desirable to distinguish electrical conduit from other types of piping, or where color is essential for other reasons.

FLUORESCENT NYLON FABRICS

■ A new line of fluorescent-color vinyl coated, nylon fabrics has been introduced by the **Vulcan Division of Reeves Brothers, Inc.**

The red fabric is used for safety flags and for conspicuous safety clothing of traffic policemen and traffic directors on airports and on construction sites.

The vinyl coating of the completely waterproof fabric is impregnated with fluorescent pigments that give a high light reflection during day and night.

The most commonly used color is red, but the fabric is also available in yellow, orange, and other colors. Width of fabric is 39 inches and 56 inches; weight, 10 oz. per sq. yd.

EXPLOSION-PROOF RECEPTACLE

■ **Crouse-Hinds** Type EHR receptacle and Type EHP plug are designed to meet the requirements of N.F.P.A. Bulletin 56. The explosion-proof receptacle, used in combination with a washable, watertight plug combines the hospital feature of asepsis with the extra protection of a grounded, keyed and flame-tight electrical receptacle.

The EHP plug is especially keyed so that it is the only plug that will actuate the EHR receptable, but the EHP plug can also be used in standard non-explosion-proof Hubbellock receptacles. Its 3-wire construction offers the further safety of equipment grounding.

For complete information on this important addition to explosion-proof hospital equipment, write **Crouse-Hinds Company, Syracuse 1, N. Y.**

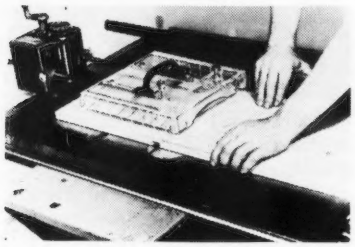
ROOF DRILLING COMBINATION

■ A new Kennametal FVH Roof Bit and Drill Steel Combination, designed for maximum dust removal without loss of drilling speed, has been announced by the **Mining Tool Division of Kennametal Inc., Bedford, Pa.**

The drill steels feature heat-treated prefabricated chucks and shanks. This permits the attainment of strong metallurgical properties in these components which, otherwise, would not be possible. A second feature of the half-inch square chuck is an integral collar that traps the dust in the slotted section above it, through which the dust is drawn into the hollow drill steel.

The new Kennametal internal dust collection roof drilling combination has been approved as permissible by the U.S. Bureau of Mines.

"ELEVATING RISER BLOCK"



■ A new aluminum filler plate, known as "Elevating Riser Block," fitted to the bottom of the self-adjusting metal base of the "see-thru-Brett-Guard Safety Saw Device," has been announced by the **Brett-Guard Corp., Englewood, N. J.,** to permit wood of thicker stock to be cut with fool-proof protection.

Woodworking table saws have always endangered operators' fingers and eyes by shooting vicious chips commonly known as "kickback." Existing saw guards have been considered cumbersome and blocked worker's vision. Operators have been inclined to thrust them aside and work with the blade exposed.

To eliminate these hazards safety engineers of the New York Central Railroad worked out the idea of inserting an aluminum filler plate added to the base of the Brett-Guard housing to accommodate wood stock of a thicker dimension up to seven inches. Previous limitation of this type of protection allowed maximum of four inches.

This new engineered filler plate unit now produced by Brett-Guard can be either surface or flush mounted on the table saw.

NEW LEAK-PROOF CANISTER

■ A seamless leak-proof canister—first of its kind—spearheads a list of exclusive features in the complete new line of gas mask respiratory protection just introduced by Mine Safety Appliances Company, Pittsburgh.

The new drawn canister removes potential sources of leaks, since side and top seams have been completely eliminated. It climaxes several years of research and development.

The new line of masks also includes a totally different concept in harness design, and a rugged plastic case that is chemically inert and resistant to moisture.

Every canister is equipped with a high-efficiency toxic dust filter which, together with the appropriate chemical fill, permits its use in atmospheres containing both gaseous and particulate contaminants. The special filter provides greater application flexibility and reduces the number of types of canisters necessary to provide protection against gaseous and toxic aerosols.

Highly active sorbents are scientifically arranged for controlled gas flow and maximum service life. A system of internal baffles also helps control gas flow.

A threaded neck on the canister permits rapid disconnect from the breathing tube, thus speeding replacement. This simplifies maintenance and prolongs life of the breathing tube by eliminating gouging from clamp removal and attachment. Similarly, a universal coupling nut on the facepiece of the mask facilitates disassembly from the breathing tube.

Color coding of the canister meets identification requirements of the American Standards Association and the U. S. Bureau of Mines.

NEW HEAD PROTECTION

■ A new line of safety hats and caps—produced for the first time from polycarbonate materials for greater impact and penetration resistance—has been developed by **Mine Safety Appliances Co., Pittsburgh.**

The improved head protection will be made in three models, each of unique design: firemen's helmets, electric utility hats and caps, and general industrial hats and caps.

Tests have shown that the impact and puncture resistance of the new hats exceeds the requirements set by federal specifications for safety helmets on the market. In addition, the electric utility hats and caps retain their dielectric strength even under sever impact, and at temperatures ranging from 100 degrees below zero to 270 degrees above.

For further information write to **Mine Safety Appliances Co., 201 N. Braddock Ave., Pittsburgh 8, Pa.**

CHEMICAL FIRE EXTINGUISHER

■ A new 2½ pound dry chemical fire extinguisher will be featured by **Walter Kidde and Co.** at the National Safety Congress and Exposition, Booth 96-7.

The pressurized "Kidde Kompact" extinguisher has a suggested retail price of $11.95. Its U.L. rating of 4-B:C is the highest given to any extinguisher of its capacity—equal to eight 1 qt. carbon tets.

The units feature fast, self-evident operation. When unit is picked up with carrying handle the safety lock automatically releases; then nozzle is aimed at base of flame and discharge lever is pressed.

To recharge, unscrew and throw away the empty powder container and replace with a new pressurized cylinder. Replacement units cost $3.95.

Inquiries should be addressed to **Walter Kidde and Co., Inc., 675 Main St., Belleville 9, N.J.**

PORTABLE OZONE RECORDER

■ A new portable ozone recorder, Model 725-3B, for use in atmosphereic ozone recording in air pollution, industrial hygiene, weather and aggricultural studies, is now available from **Mast Development Co.**

Operating range of the recorder is 0 to 100 pphm/volume with a sensitivity of ±2 per cent of full scale. Sampling rate is approximately 140 cc per minute with a response time of 75 per cent of true value in one minute.

Model 725-3B incorporates the same type of microcoulomb ozone sensor used in the company's 730-3 ozonesonde.

For further information on the new portable ozone recorder write **Mast Development Co., Inc., 2212 East 12th St., Davenport, Iowa.**

Trade Literature

TELEPHONE-LOUD SPEAKER

■ Designed for use in mines, factories, refineries, mills, and other locations, a combination telephone and loud speaker is described and illustrated in a bulletin now available from **Mine Safety Appliances Company, Pittsburgh.**

The transistorized M-S-A Pager is self-contained and utilizes existing inter-plant or mine telephone lines.

The new unit is individually powered by two dry cell, long life batteries that are employed only when the M-S-A telephone-loud speaker is in use. Ten or more Pagers can be installed on a single line. Amplification from its transmitting amplifier enables the unit to transmit as much as 10 miles over existing telephone lines.

Copies of the bulletin—No. 1600-1—may be obtained by writing: **Mine Safety Appliances Company, 202 N. Braddock Ave., Pittsburgh 8, Pa.**

BULLETIN DESCRIBES CONDUITS

■ "Color-coded" Sherarduct Conduit with MVC-1 coating, is described and illustrated in a 4-page bulletin, No. 713, available on request from **National Electric Division, H. K. Porter Company, Inc., Porter Building, Pittsburgh 19, Pa.**

This is a rigid steel conduit available in a choice of five colors—red, orange, yellow, blue, and green. The conduit is protected against corrosion by "Sherardizing," and exclusive galvanizing process, which alloys zinc powder to the steel walls and threaded ends. A coating of a special acid-resisting MVC-1 Poly-Vinyl, in which the color pigments are contained, is then baked on.

In addition to its use in electrical installations, the "Color-coded" Sherarduct Conduit is expected to have applications wherever color-conditioning is required, such as in hand rails and structural uses.

NEW FIRE BLANKET

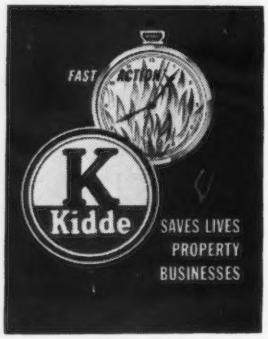
■ A compact wool blanket that snuffs out flames quickly and completely from head to foot when clothing is afire is described and illustrated in a new bulletin available from **Mine Safety Appliances Company, Pittsburgh.**

The fire blanket is specially designed for use in chemical plants and laboratories, and in many other industries, including paint, steel mill and foundry, ordnance, oil refining and drilling, gas drilling, glass, and distilling.

The 62 by 82-inch flameproofed blanket is packaged in a rugged, red-colored case designed for vertical attachment to a wall near danger points in industrial plants. A loop of fireproofed rope extends outside the case. In an emergency, the victim pulls the rope. This opens the metal case door and permits the pleated protective covering to move forward as the victim revolves, wrapping himself in the blanket.

Copies of the bulletin—No. 0408-22—may be obtained by writing: **Mine Safety Appliances Company, 201 N. Braddock Ave., Pittsburgh 8, Pa.**

PORTABLE FIRE EXTINGUISHERS



■ A new 12-page booklet illustrates and describes full line of Kidde portable fire extinguishers, smoke and fire detectors, and built-in carbon dioxide systems. Brochure P-67 is available from **Walter Kidde & Company, Inc., Belleville 9, N. J.**

Featured in the booklet is a chart outlining which types of extinguishers are suitable for use on ordinary combustible (Class A), flammable liquid (Class B), and electrical fires (Class C), according to Underwriters' Laboratories standards.

Also included is informative material concerning wheeled and fixed dry chemical and carbon dioxide units, accessory items, and containers for pressurized gases and liquids.

USES, HANDLING OF TMB

■ A 12-page bulletin describing properties, uses, and handling of the versatile chemical, Trimethoxyboroxine (TMB), has been issued by **Callery Chemical Company.**

The booklet covers in detail the principal applications of TMB as a metals fire extinguishant; as a primary curing agent for epoxy resins; and as an agent for nitrogen removal from refinery feed stocks. Case histories are given on experimental fire extinguishment for zirconium sponge, magnesium chips, titanium sponge, and magnesium castings.

Typical physical properties listed include vapor pressure at varying temperatures; solubility of organic liquids in TMB at 25 C; and solubility of inorganic compounds in TMB. Storage, handling, and shipping information is also detailed.

Copies of the bulletin, CT-520, can be obtained by writing **Callery Chemical Company, Callery, Pa.**

NON-FOGGING EYE WEAR

■ Practical, convenient, non-fogging eye protection, easily adaptable to all types of head protection, is described and illustrated in a bulletin now available from **Mine Safety Appliances Company, Pittsburgh.**

This Skullgard Eyeshield is suited for many phases of industrial and mining work.

Copies of the bulletin—No. 0302-5—may be obtained by writing: **Mine Safety Appliances Company, 201 N. Braddock Ave., Pittsburgh 8, Pa.**

Trade News

Jack Chaney Joins Staff of Fibre-Metal, Inc.

JACK CHANEY has recently joined the Sales Staff of Fibre-Metal Southeast, Inc. of Decatur, Ga.

Jack is a native Georgian. He attended Georgia Military College, has had previous experience in selling and has recently completed intensive sales training at The Fibre-Metal Products Company, Chester, Pa. and Glendale Optical Company of Valley Stream, Long Island.

Jack will call on and work with customers in Southern Alabama, Southern Georgia and Florida. His addition further compliments the policy of Fibre-Metal Southeast, Inc. to provide sales training and field assistance to all distributorss.

■ ■ ■

Geo. I. Schrank Named to Post At Walter Kidde

GEORGE I. SCHRANK has been appointed Manager of Engineering, Industrial and Marine Division, Walter Kidde & Company, Inc., Belleville, N.J. Mr. Schrank joined Kidde in 1952 and most recently served as Chief Design Engineer, Industrial and Marine Division.

He attended Columbia University where he was awarded the degrees of B.S. in mechanical engineering and M.S. in industrial engineering.

IMPROVE MMR* INSTRUCTION

*MMR = Mouth-to-Mouth Resuscitation

GET THE FEEL!

- Breathe Life Trainer (BLT) simulates all conditions such as:
  Obstruction upper airway
  Distention of stomach
  Improper seal
  Improper head position
  Partial obstruction, etc.

- *Only* with a BLT can you teach how to recognize and overcome the above conditions.
- *Only* with a BLT will the student "get the feel" of performing MMR* correctly with confidence.
- *Only* with BLT practice will the student become emotionally and mentally conditioned to perform MMR* without hesitation.

DON'T BE FOOLED!

- No film or lecture can replace training and practice.
- MMR* techniques must be demonstrated and practiced just as in other manual methods.

The new BLT is simple...safe from danger of cross-contamination...the most economical training device available for class participation.

ORDER YOUR BREATHE LIFE TRAINER TODAY.

No. 70 BLT, complete with instructions in zip-lip case..... $12.75 ea

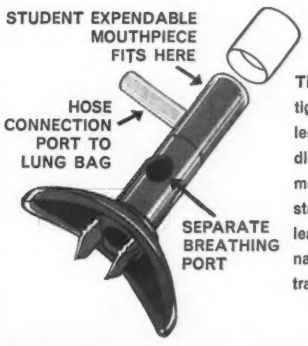
No. 72 expendable individual mouthpieces, 50 per box..... 1.50 ea

Write for FREE copy of the new "Heart-Lung Resuscitation" booklet explaining MMR* and closed chest cardiac massage.

See your MSco distributor or write

Medical Supply Company
Dept. EG1, Rockford, Illinois

New Improved Facepiece for Your Breathe Life Trainer



This new flexible flanged tight-fitting facepiece is less bulky; easier to handle, to clean, and sterilize; more comfortable on instructor. No chance of leakage or cross-contamination, will fit your present trainer. $2.00 ea

INDEX OF ADVERTISERS

ROSE MANUFACTURING CO. Harold Walter Clark, Inc.	**2**	*Frees both hands for ladder work.*
LEHIGH SAFETY SHOE COMPANY Hicks & Griest, Inc.	**3**	*"Living Leather" stays new-looking 50% longer than ordinary leather.*
WILLSON PRODUCTS Howard H. Monk & Associates, Inc.	**5** **6**	*Results of impact test show Willson Super-Tough lenses resist impact 5 to 9 times longer than other lenses tested.*
THE FIBRE-METAL PRODUCTS COMPANY The Kotula Company, Inc.	**11**	*Offers a variety of head and face protection with hats and caps, all with new Dual Suspension.*
MINE SAFETY APPLIANCES COMPANY Ketchum, MacLeod & Grove, Inc.	**13**	*Fifteen new MSA products to be shown at the MSA booths at the National Safety Congress.*
MEDICAL SUPPLY COMPANY Howard H. Monk & Associates, Inc.	**15**	*"Rescue Breather" makes mouth-to-mouth rescue breathing safe and unobjectionable.*
UNITED STATES SAFETY SERVICE CO. Pollard and Hamer, Inc.	**17**	*Hints at a new "first" in safety eyewear to be seen at the National Safety Congress.*
G. H. PACKWOOD MANUFACTURING CO.	**22**	*Pax-Lano-Sav cleans a wide variety of materials from the skin with more washups per dollar than any other cleaner.*
THE FYR-FYTER COMPANY Weber, Geiger & Kalat, Inc.	**43**	*New all-purpose Dry Chemical Extinguishers carry highest Underwriters' Laboratories "ABC" ratings.*
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HAWS DRINKING FAUCET COMPANY Pacific Advertising Staff	**49**	*Illustrates wall-mounted eye-wash fountain Model 7300; offers catalog.*
SEISCOR Watts, Payne—Advertising, Inc.	**50**	*Offers information on special 2-way radio for use in hazardous locations.*
CHANNING L. BETE CO., INC.	**51**	*Describes numbers of safety booklets that "communicate;" offers set of eight samples.*
MEDICAL SUPPLY COMPANY Howard H. Monk & Associates, Inc.	**57**	*New Breath Life Trainer to improve MMR; offers free booklet on MMR and closed chest cardiac message.*
AMERICAN OPTICAL COMPANY Fuller & Smith & Ross, Inc.	**Back Cover**	*New AO Dura-Guard plastic hats and caps meet or exceed all standard specifications; offer to send folder.*

CIS

The International Occupational Safety and Health Information Center

THE NEED

In recent years it had become evident that the need for complete and up-to-date information on every aspect of accident prevention and health protection could not be adequately met except through a world-wide, specialized service. To meet this need the International Occupational Safety and Health Information Center (CIS) was founded in 1959 in Geneva, Switzerland, by the International Labour Office, with the collaboration of the International Social Security Association, the support of the High Authority of the European Coal and Steel Community, the European Economic Community and the World Health Organization, and the active participation of 23 specialized national institutions in countries throughout the world. Now more than 30 Centers are participating in the accident prevention information program.

THE SERVICE

Subscribers receive information from the CIS on 3" by 5" cards, which are sent out every three or four weeks in English, French and German editions. They also receive, at no extra charge, the other publications of the Center. Only complete sets of cards are supplied. The interdependence of the subjects and the prohibitive cost of sorting to meet individual requirements make it impossible, at present for the CIS to accept partial subscriptions.

The Original publications to which the cards refer are kept and classified by the national centers and by the CIS. Subscribers can purchase photocopies or microfilms of texts which they cannot obtain directly from the publishers on application to their national center or to the CIS in Geneva.

A.S.S.E.—NATIONAL CENTER

The American Society of Safety Engineers is one of the three national centers in the United States. Subscriptions to the annual service are $40.00 a year and may be ordered through the American Society of Safety Engineers.

World-Wide Coverage of occupational safety and health literature and legislation

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5 NORTH WABASH AVENUE, SUITE 1705
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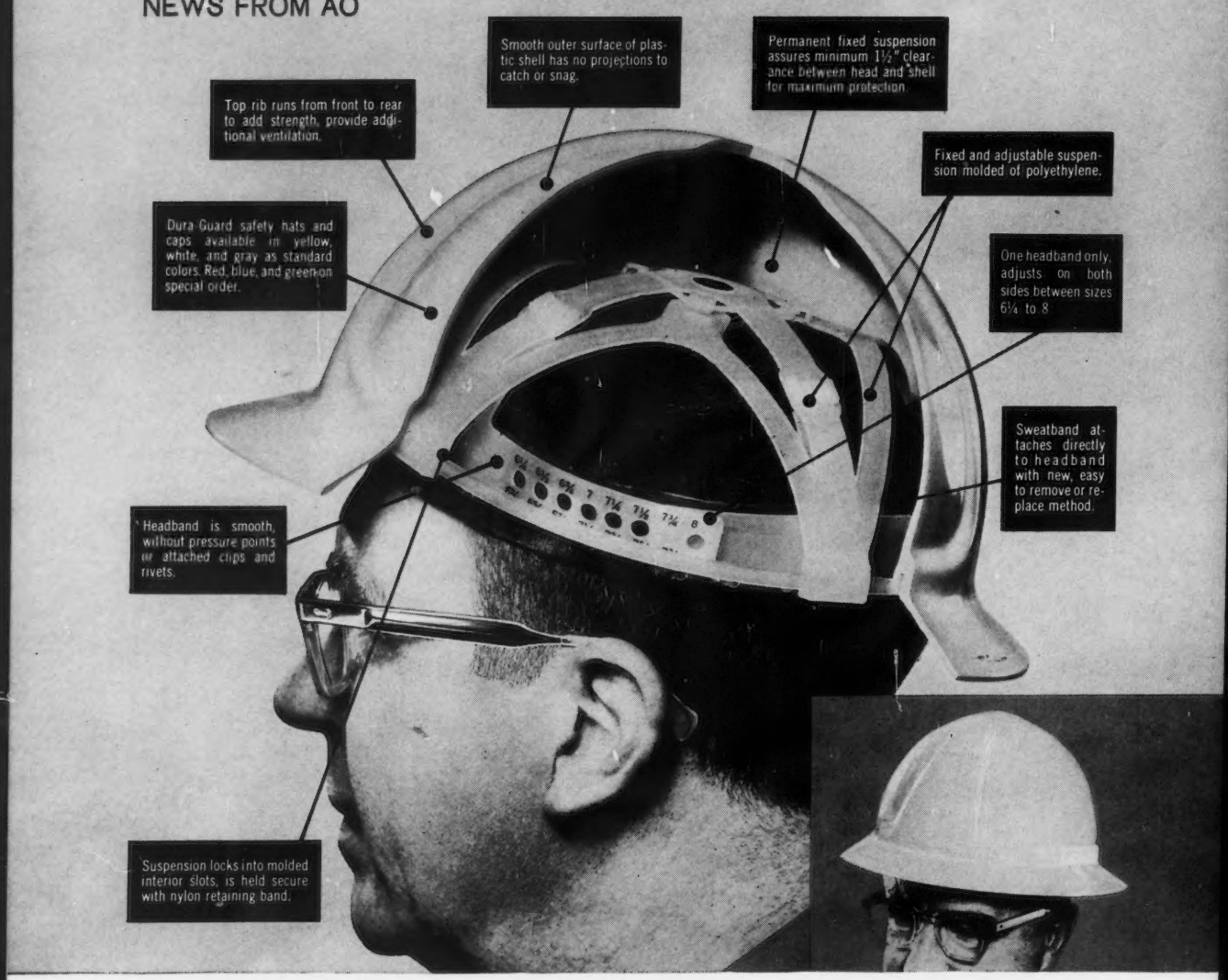
NEWS FROM AO


Smooth outer surface of plastic shell has no projections to catch or snag.
Permanent fixed suspension assures minimum 1½" clearance between head and shell for maximum protection.
Top rib runs from front to rear to add strength, provide additional ventilation.
Fixed and adjustable suspension molded of polyethylene.
Dura-Guard safety hats and caps available in yellow, white, and gray as standard colors. Red, blue, and green on special order.
One headband only, adjusts on both sides between sizes 6¼ to 8
Sweatband attaches directly to headband with new, easy to remove or replace method.
Headband is smooth, without pressure points or attached clips and rivets.
Suspension locks into molded interior slots, is held secure with nylon retaining band.

Now: one safety hat to meet all requirements

Introducing the AO Dura-Guard . . . an *all-new* safety hat designed for *universal use*. Shells and suspensions are molded plastic, without holes or metal parts. New Dura-Guard hats and caps meet or exceed all standard specifications, and *every* Dura-Guard may be used wherever dielectric protection is required. Dielectric strength in accordance with E. E. I. specifications (April, 1961) is available in individually tested hats and caps.

The injection molded shell is of uniform thickness throughout critical areas. Plastic suspension and headband are lightweight, comfortable, long-wearing, nonconductive, easy to clean. Headband adjusts on *both* sides to stay centered in shell, eliminate floating. Sweatband can easily be slipped out for cleaning *without removing any other part*, is made in telescoping halves for comfort and economy. Front half, which tends to soil or wear first, can be replaced at minimum cost.

For full information, contact your AO Safety Products Representative, or write for Folder S-1456.

Your Surest Protection . . . AO SURE-GUARD Products

American Optical COMPANY

SAFETY PRODUCTS DIVISION • SOUTHBRIDGE, MASSACHUSETTS